FEBRUARY, 1914.

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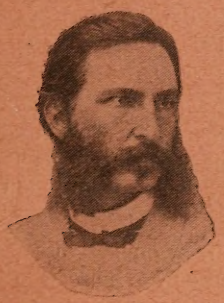

J. Brackenridge Clemens,
Died 1867.

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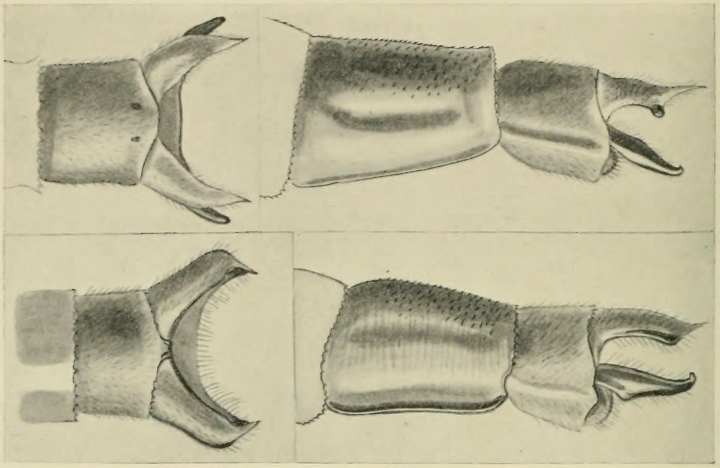

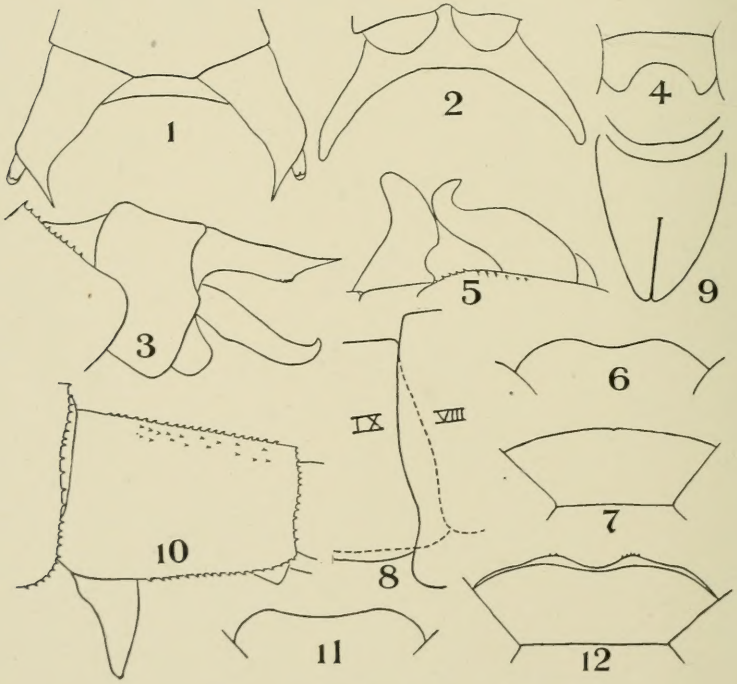

GOMPHUS PALLIDUS, ETC.—WILLIAMSON.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. XXV. FEBRUARY, 1914. No. 2.

CONTENTS:

Gomphus pallidus and Two New Related Species (Odonata).

By E. B. WILLIAMSON, Bluffton, Indiana.

(Plates IV and V.)

Recently in identifying some dragon flies from Florida collected by my father, L. A. Williamson, I had occasion to study a pair of *Gomphus* taken in copulation by him at Salt Lake, St. Petersburg, Florida, March 31, 1913. These were evidently *G. pallidus* Rambur, but they certainly differed from specimens from Texas and Oklahoma which I had at an earlier date also determined as *pallidus*. When the Florida material was first studied I had referred all my material from Texas and Oklahoma to one species, and, with this idea in mind, I sent rough sketches of the two species to several students in the hopes of learning more of their distribution. Later, when the southwestern material was studied, two species were found to be included in it, to only one of which, *submedianus* n. sp., my

sketches applied. This correspondence, which will be referred to again, clearly indicates that in recent literature two or more species of dragon flies have been confused under the name of *pallidus.*

I have no doubt of the existence in the genus *Gomphus,* as generally used, of several subgroups, along the lines indicated by de Selys and Professor Needham. As soon as possible it will be convenient to use these subgroups as genera. But before this can be done an exhaustive study of the approximately seventy species involved will be necessary. At present no one can use these group names intelligently. These groups have been defined by Professor Needham, so far as imagoes go, in terms not used or emphasized by de Selys, whose groups were based largely on thoracic pattern, though the resultant groupings, in the two cases, have much in common. For example de Selys' Group 5 includes *pallidus* (and *villosipes*), *lividus, spicatus, minutus* and *exilis. Arigomphus,* as used by Needham, includes *pallidus, villosipes, spicatus* and other species not known to de Selys in 1858, the date of the *Monographie. Lividus* and *exilis* are placed in another group by Needham, who has not discussed *minutus.*

As stated above the groups require accurate definition. So far as de Selys goes, *spicatus* and *exilis,* at least, should not be associated with *pallidus;* and in Needham's arrangement it is certainly a mistake to separate *exilis* and *spicatus,* for example. *Arigomphus* is defined (Aquatic Insects Adirondacks, p. 447-8) as having two cells between the base of veins A1 and A2 at their origin. Five males and one female of *villosipes,* selected at random, all have a single cell. Three males of *cornutus,* which is an *Arigomphus,* have two wings with one cell, and four wings with two. This character is tabulated below for the material discussed in this paper. To the shape of the apex of abdominal segment 8 some importance may attach, but the character is difficult of accurate definition (see Fig. 8, and explanation). As to the hind femora in the two sexes, I have examined thirty species of which I have both sexes, and the femora are different in the sexes in all of them. In the males

the last femur has short or very short subequal numerous spines or teeth, and no hair, sparse non-concealing hair, or long dense hair. In the females the spines on the apical half or two-thirds of the femur are longer and sparser than on the basal portion. But hairiness in the male is not a characteristic of *Arigomphus.* In fact, it is not evident why Professor Needham included *spicatus* in *Arigomphus;* and in *furcifer,* which I agree with him belongs in *Arigomphus,* the femur has very sparse hair, and the term hairy could better be applied to *viridifrons, brevis* and *abbreviatus,* for example. The position of the posterior hamule of the male seems a valuable character, though applicable only to the one sex.

Not wishing at this time to discuss these subgroups of *Gomphus,* it is nevertheless necessary, in order to give some idea of the relationships of the two new species described in this paper, to point out some characters which they possess in common with others of the genus. Briefly some of these characters are as follows: Thorax green, varying in shade with age, sex and species, and with distinct markings if present confined to the region of the mid-dorsal carina and the humeral suture. Face without dark markings. Legs robust, hind femora extending beyond the auricles; in the male with short subequal spines and more or less hair; in the female without hair, or with very sparse hair, and with unequal spines, many of which exceed the spines of the male and which are longest at about two-thirds the length of the femur. Posterior hamule of male directed posteriorly; posterior edge of seminal vesicle, seen in profile, distinctly concave or excavated. Vulvar lamina one-fourth to one-half length of segment 9, triangular, apex divided for a short distance with the branches pressed together or parallel. North America, east of the Rocky Mountains.

The species may be grouped as follows:

Legs dark, last femora black; *furcifer, villosipes, cornutus, lentulus,*[1] *australis.*[1]

[1] *Australis* and *lentulus* are known to me only from descriptions. So far as I know, only the types are known, unless a male, referred by Muttkowski to *lentulus,* should prove to be that species (New Records

Legs paler, last femora largely pale; *pallidus, submedianus, subapicalis.*

Material Examined and Literature.

Gomphus pallidus Rambur.

Through the great kindness of Mons. Guillaume Severin and Mr. Samuel Henshaw, I have been able to study the classical material of de Selys and Hagen. De Selys' material consists of one male and three females, including the two female types of Rambur. In addition Mons. Severin sent me the single specimen of *G. villosipes* in the de Selys collection. For convenience I have designated these specimens numerically.

De Selys 1,—*G. villosipes* male, a slightly teneral, badly faded specimen, labelled in de Selys' hand, "*G. villosipes* ♂, Philadelphia, Calvert."* This is lightly smaller and less robust than Pennsylvania, Ohio, Indiana and Illinois specimens in my collection. However, I believe all represent a single species.

De Selys 2,—labelled, "*Gomphus pilipes.* Hag. ♂ (♂ de *pallidus.*") "N. America.". "*Gomphus pallidus* R. ♂."

De Selys 3,—labelled "*Gomphus pallidus* R. ♀."

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of Wis. Drf. Vol. IX, April 1911, Bull. Wis. Nat. Hist. Soc., pp. 36, 37, plate IV. "A single male in the Brooklyn Museum, locality unknown.") The type of *lentulus* is stated to be in the collection of Mr. C. A. Hart, but this is a mistake as the following quotation from a letter of April 21, 1913, from Mr. Hart shows: "As to *lentulus* a university student captured it, and I attempted to name it. It was badly broken and I attempted to mend it; in so doing I disturbed the genitalia, but as I had already studied these carefully and they seemed unlike anything I had ever seen, I managed to keep them about as they were. The question of the location of the type has come up before. I can only say that it is not in the State Laboratory Collections, so far as I know, and that I have no dragonfly collection." This loss is the more unfortunate from the fact that *lentulus,* like *australis,* was not figured, nor were characters for separating them from their closest allies pointed out. It seems to me that *australis* is probably not closely related to species included under *Arigomphus* in this paper. The larva of *australis* (supposition) is known, but it is possibly *pallidus,* since the Illinois specimens, described by Needham and Hart as *pallidus,* are not that species.

*[As I never obtained *villosipes* in Philadelphia, it is likely that this specimen is from one of the Pennsylvania localities cited on p. 245, Trans. Amer. Ent. Soc. vol. xx, with my original locality label displaced.—P. P. Calvert.]

De Selys 4,—one of Rambur's types, labelled, "Collect Latreille," then below this is a red ink margined label, one end of which has been torn off, on which is written in red ink "Amer. Sept.," following which is some character which may be a continuation of the abbreviation of 'septentrionale,' but which resembles the figure 6 with a long comma or figure 7 below it as much as anything. It is hardly possible, however, that this is a date, September 6. Below this label is a small rectangle of gilt paper.

De Selys 5,—the other of Rambur's types, a small label "♀," below this a label similar to the red-inked label of the other type, but in this case the ink is faded to brown, and one end of the label is cut off obliquely, instead of being torn, on which is written a word the first four letters of which are plainly "Pari," but the last letter or character of which I cannot be sure; this is the label "Paris" of Rambur; below this label is a bit of gilt paper, as in the other type, and below this a long narrow label *"G. pallidus."* The entire abdomen of this specimen is lost.

Hagen's material consists of 3 males and 1 female: Hagen 1,—a teneral male bears Hagen's printed label "Hagen" and "Florida, Thaxter."

Hagen 2,—a male in good condition, labelled "Ft. Reed, Fla., Apr. 26, '76," and *"Gomphus pallidus* Rbr."

Hagen 3,—a male, with abd. appendages broken off, labelled "New Orleans," *"G. pallidus* Rbr." *"Gomphus pilipes* Hagen, ♂ a vous" (on this label is glued the thoracic sclerite from between the front wings), *"G. pilipes* Sel." This is the type of *pilipes.*

Hagen 4,—a female in good condition, with the printed label "Hagen" and *"G. pallidus* Rbr., Georgia" and a word I cannot decipher followed by 7 (de Selys records *pallidus* from Georgia in May).

In my collection, a pair, in copulation, Salt Lake, St. Petersburg, Florida, March 31, 1913, L. A. Williamson.

The references to the literature of *pallidus* cited by Kirby, Catalogue p. 64, all relate to papers by de Selys and Hagen, and all I believe refer to true *pallidus.* In two places in the *Monographie* de Selys refers, apparently inadvertently, to *pallidus* as *pallens,* p. 148 (408), and 415 (675).

In the Dragonflies of Indiana, 1899, p. 291, and in Additions to the Ind. List, Proc. Ind. Acad. Sci., 1900, p. 176, two females from Elkhart Co., Indiana, collected by R. J. Weith are recorded as *G. pallidus.* One of these specimens is in the Phila. Acad. Nat. Sci. Collection and Dr. Calvert writes that the occiput is very close to my sketch of *submedianus.* It is probable that both Weith's specimens are *submedianus.*

Needham, Can. Ent. 1897, p. 166, and Needham and Hart, Bull. Ill. St. Lab. Sept. 1901, pp. 14, 16, 67, 77, 79-81 and 87, refer to Illinois specimens as *pallidus.* Letters were written to both Professor Needham and Mr. Hart. Professor Needham writes: "Clearly there are

two things we have been calling *G. pallidus*. I have male specimens from the type locality and both sexes from Florida that correspond exactly with your sketches of *pallidus*. I have many others from Galesburg, Ill. (determined long since, when I first began collecting, for me by Kellicott) that agree with your sketches of *submedianus*. And I have no intermediates." Mr. Hart kindly sent me drawings of the postocellary vertical ridge of the male and of the occipita of the 2 females in the State Laboratory Collection. Evidently the specimens are *submedianus*.

Calvert, Occas. Papers Bost. Soc. Nat. Hist. VII, 1905, p. 20, reports *pallidus* from Waltham, Mass. (Hagen). This record probably refers to true *pallidus*.

Dr. Calvert in addition to notes on the Weith specimen from Indiana, mentioned above, sent me notes on the other specimens in the Phila. Acad. Two males from Texas are *submedianus* or *subapicalis* (these two species were not distinguished in my correspondence with Dr. Calvert); a Florida male is intermediate, so far as my sketches of the postocellary vertical ridge go, between *pallidus* and *submedianus*, this specimen is doubtless *pallidus*. A female from Thomasville, Georgia, is *pallidus*.

Wilson, Drf. Cumberland Valley in Ky. and Tenn., Proc. U. S. Nat. Mus., September, 1912, pp. 192 and 199 states "that the river is entirely patrolled by *pallidus*." It is impossible to state what species is here referred to.

I wrote to Mr. Currie for data on *pallidus* in the U. S. Nat. Mus. A male, labelled Texas, is *submedianus* or *subapicalis;* a female from Missouri and a female from Henderson Co., Illinois, are *submedianus*. These are the only specimens under the label *pallidus* in the Nat. Mus. Three other references in literature to *G. pallidus* do not record anything of interest in this connection.

Gomphus submedianus n. sp.

Bay City, Texas, May 24, 1907, ♂ (type) and teneral ♀; Williams Lake, Matagorda, Texas, May 26, 1907, ♂; Wister, Oklahoma, June 3, ♀, and June 4, 1907, 3 ♂, 1 ♀. Association of the sexes supposition only. For literature see under *pallidus*. For description of localities see under *subapicalis*.

Gomphus subapicalis n. sp.

Bay City, Texas, May 24, ♂ (type), and May 27, 1907, ♀; Williams Lake, Matagorda County, Texas, May 26, 1907, ♂. Association of the sexes supposition only. For literature see under *pallidus*. On May 24 I collected near Bay City,

Texas, by pools along the railroad to Brownsville. Both *submedianus* and *subapicalis* were taken, but were not distinguished at the time. The two species were associated again at Williams Lake on May 26. On June 3 and 4 *submedianus* was taken at an artificial lake along the Frisco R. R. about 1½ miles north of Wister, Oklahoma.

Characters of pallidus, submedianus and subapicalis.

Size.—Abdomen: *pallidus,* male 39-42, female 40-43; *submedianus,* male 38-41, female 39-42; *subapicalis,* male 39-40, female 40.

Hind wing: *pallidus,* male 31-33, female 34-36; *submedianus,* male 30-33, female 35-39; *subapicalis,* male 31-34, female 36.

Head.—Face unmarked, apparently yellowish green in *submedianus* and *subapicalis,* and paler green, without yellowish, in *pallidus.* In Rambur's types, de Selys 4 and 5, much discoloration is evident; in 4 entire face and frons above are brown; and in 5 the frons, both in front and above, is sharply brown. The color pattern of the frons at its base above is distinct in the three species; in *pallidus* there is a brown basal stripe of practically uniform width, if anything widest at the middle; in *submedianus* the stripe is distinctly notched or narrowed in front of the median ocellus; and in *subapicalis* it is reduced to two spots, one on each side of and in front of the median ocellus, these spots joined medianally in the single female. The entire vertex is dark brown, almost black, in *pallidus;* in *submedianus* it is paler, and the postocellary vertical ridge is still paler and greenish, only slightly darker, especially along the anterior border, than the frons and the occiput; *subapicalis* is fairly intermediate between the two others in this character. Fig. 28 is of the postocellary ridge in a Florida male of *pallidus;* Hagen's 1 and 2 have the ridge much like figure 31; *pallidus* and *submedianus* males which might be confused by the form of the appendages, are certainly clearly separated by the form and color of this ridge.

Thorax.—Green, apparently inclining to brownish in *pallidus* and yellowish green in the other two. So far as I can detect in the *pallidus* before me there is no dorsal stripe on either side of the carina, and the carina itself is pale excepting at the median angle. In *submedianus* and *subapicalis* the carina is dark above the median angle, and there is a very narrow dorsal stripe on either side, or this reduced to a vestige or, in one male of *subapicalis,* entirely wanting. (This variation, I believe, is not entirely due to post-mortem changes.) (In the single female referred to *subapicalis* the thoracic markings are the most developed of any specimen before me; in this case the dorsal stripes are wide and long, and closely approach the middorsal carina). Antehumeral brown stripe present (wanting in

some *pallidus* due to post-mortem changes or loss of thoracic contents), widest and most definite in *submedianus* and *subapicalis*. The humeral stripe, like the antehumeral, in *pallidus* is narrow, obscure, and scarcely evident; in *submedianus* it is reduced to a line, in striking contrast to the well developed antehumeral; in *subapicalis* it is nearly as wide as the antehumeral.

Venation between A1 and A2.

I. Two cells of about equal size in first series[1], A1 angled[2]: *submedianus*, 2 male wings, 20%; *subapicalis*, 3 male wings, 75%.

II. Two cells in first series, the proximal one of these two long and narrow, A1 not angled: *pallidus*, 9 male wings, 90%, 4 female wings, 40%; *submedianus*, 1 female wing, 16.7%.

III. One cell in first series, A1 angled: *pallidus*, 1 male wing, 10%; *submedianus*, 8 male wings, 80%, 3 female wings, 50%; *subapicalis*, 1 male wing, 25%, 1 female wing, 50%.

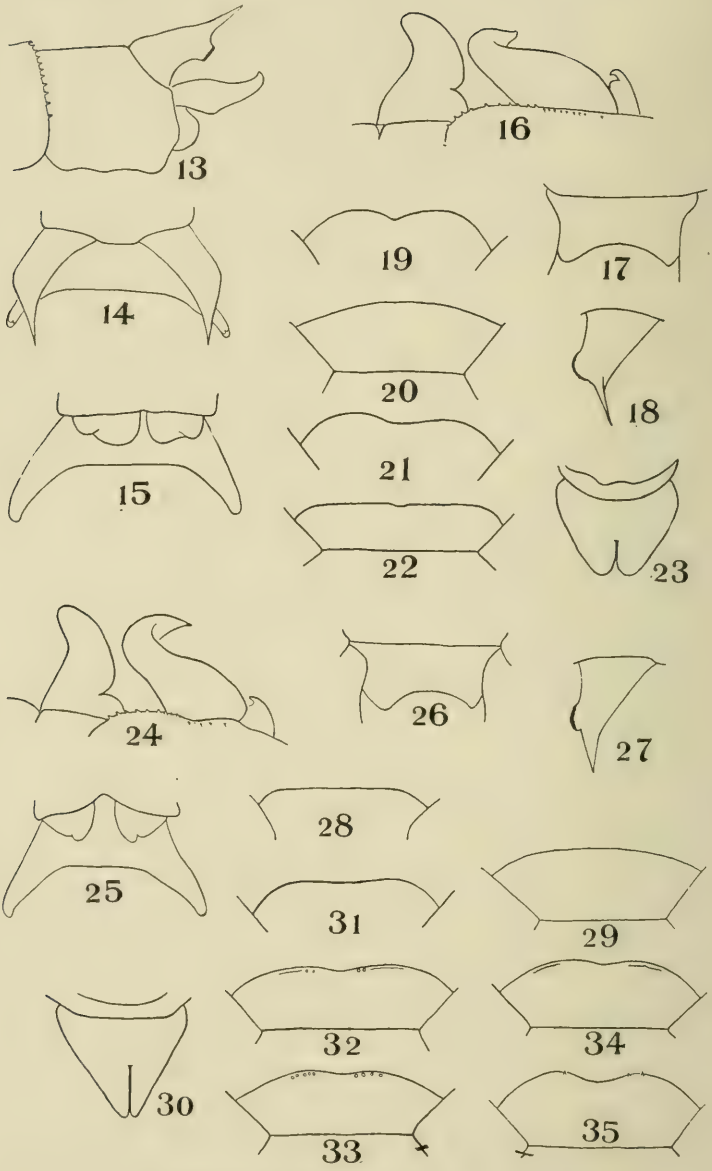
IV. One cell in first series. A1 not angled: *pallidus*. 6 female wings, 60%; *submedianus*, 2 female wings, 33.3%; *subapicalis*, 1 female wing, 50%.

Legs.—Light brown in *pallidus*, femora darker apically and dorsally, tibiae gray dorsally, tarsus black, second joint of last tarsus gray, and first joint of same tarsus gray in the middle; last femora with some hair in the female, and in the male almost covered with brown pile. In the other two species the femora are not nearly so hairy, and there is a distinct color pattern of dark on a ground color paler than the light brown of *pallidus*. In *submedianus* the legs are green or yellowish green, the femora apically and dorsally black; the tibiae black ventrally and, in sharp contrast, yellow dorsally, tarsus patterned as in *pallidus*, but the middle joint of the middle legs shows more or less pale also; from the apical black of the last femur three fine lines run basally on the dorsal surface of the femur, two of these are anterior (external) and the other is posterior (internal), the apical black occupies 1 to 2 mm., and the black lines, except sometimes the most anterior one and the posterior one in the male, do not reach the base of the femur. *Subapicalis* is similar to *submedianus*, but on the last femora the apical black is more extensive and the lines are less developed, the posterior scarcely evident, and the two anterior lines shorter than in *submedianus*.

Abdomen.—The abdominal markings are generally obscure, ill-defined and difficult of description. Probably this is true of the majority of these insects in life, and more generally true of dried material. In the absence of any notes on living colors and with

[1] In all wings examined there are 2 cells in the second series.

[2] A1 varies from distinctly angled to straight in the entire series of wings examined, so the description as angled or straight is, in some cases, arbitrary.



GOMPHUS PALLIDUS, ETC.—WILLIAMSON.

the material before me, it seems that any detailed descriptions might be more misleading than otherwise. The absence of any extensive, well defined area of black is at once a conspicuous character. In *pallidus* a dorsal interrupted green or yellowish green stripe, continued from the pale area between the wings, extends from 1-7, this stripe bordered by brown which shades out indefinitely ventrally, excepting on 1 and 2, where, as generally in the genus, the color pattern is better defined, the sides below of these two segments being similar to the pale thoracic colors; 8-10 are brown or yellowish brown, 10 the lightest color and possibly in the male sometimes yellow. In the females of the other two species the color pattern is essentially similar, but in the males of these two, segments 3-6 are largely pale, the color of the middorsal stripe, with apical dark brown spots on either side of the dorsum. In *submedianus* male segments 7-10 are similarly colored, orange or golden brown, with 10 paler. In *subapicalis*, on the other hand, segment 7 more closely resembles 6 (rather than 8) as in *pallidus*.

Abdominal appendages, male.—Yellow or yellowish brown in color, extreme apex and tubercle of the superiors and the apex of each branch of the inferior black or dark brown. In *pallidus* and *submedianus* the ventral tubercle is placed near the middle of the superior appendage; in *subapicalis* it is placed beyond the middle and in size is reduced to a minimum, the maximum being reached in *pallidus*. The appendages of *pallidus* and *submedianus* are very similar. When the appendages are in the position shown in Figs. 18 and 27, in *pallidus* the dorsal and inner edge of the right superior appendage is straight or a flat uniform curve; in *submedianus* this edge has a distinct angle at the base of the needle-like apex, as though the edge were wrinkled or folded.

Vulvar lamina, female.—In de Selys' 3 and 4 and Hagen's 4 the vulvar lamina lies close to the abdomen, but little erected; in my material in every case the lamina is more erect, and the maximum in this direction is shown in fig. 10. I believe that the position of the lamina in this respect is largely a matter of chance, since there is apparently nothing in the form of the lamina of fig. 10 to prevent it being closely appressed to the abdomen.

Explanation of Plates IV and V.

Four half tone figures from drawings from Mons. Guillaume Severin. Upper two, *Gomphus pallidus*, de Selys No. 2; lower two, *Gomphus villosipes*, de Selys No. 1.

All the numbered figures are of the same magnification.

Figs. 1-12, *Gomphus subapicalis;* figs. 1-8, male; figs. 9-12, female. 1, 2, 3, dorsal, ventral and lateral views of abdominal appendages; 4, anterior lamina; 5, accessory genitalia; 6, postocellary vertical ridge.

dorsal view; 7, occiput; 8, right profile of apex of abdominal segment 8 and base of 9 of two specimens, superimposed and with dorsa coinciding; solid line, Bay City, Texas, May 24, 1907, (the specimen from which figs. 1-7 are drawn), dotted line, Williams Lake, Matagorda County, Texas, May 26, 1907. This figure shows the difficulty or impossibility of using the shape of the apex of 8 as a definite character. Fig. 9, vulvar lamina; 10, left profile of abdominal segment 9, showing position of vulvar lamina; 11, postocellary vertical ridge, dorsal view; 12, occiput. All female figures from a specimen from Bay City, Texas, May 27, 1907.

Figs. 13-23, *Gomphus submedianus;* figs. 13-20, male, Bay City, Texas, May 24, 1907; figs. 21-23, female, Wister, Oklahoma, June 4, 1907. 13, 14, 15, lateral, dorsal and ventral views of abdominal appendages; 16, accessory genitalia; 17, anterior lamina; 18, left superior abdominal appendage, externo-dorsal view; 19, postocellary vertical ridge, dorsal view; 20, occiput; 21, postocellary vertical ridge, dorsal view; 22, occiput; 23, vulvar lamina.

Figs. 24-35, *Gomphus pallidus;* figs. 24-29, male, Salt Lake, St. Petersburg, Florida, March 31, 1913, L. A. Williamson; figs. 30-35, female. 24, accessory genitalia; 25, ventral view of inferior abdominal appendage; 26, anterior lamina; 27, left superior abdominal appendage, externo-dorsal view; 28, postocellary vertical ridge, dorsal view; 29, occiput; 30, vulvar lamina, de Selys No. 4; 31, postocellary vertical ridge, dorsal view, Salt Lake, St. Petersburg, Florida, March 31, 1913, L. A. Williamson (this specimen in copulation with male of figs. 24-29); 32, occiput, de Selys No. 3; 33, occiput, de Selys No. 5; 34, occiput, de Selys No. 4; 35, occiput, same data as for fig. 31.

To Our Subscribers.

It may be of interest to some to know that we have no way of ascertaining whether or not a subscriber wishes to renew except by receiving an order or payment from him. So we have stopped sending the NEWS on expiration of subscriptions. We have in the past tried to judge who would be likely to renew, but even then some of our oldest subscribers have discontinued after we have sent them several numbers. These copies are seldom returned and we cannot afford to lose them. This is responsible for the scarcity of the early issues of some of the back volumes. Every cent saved in the running expenses is utilized to the betterment of our journal, and we are trying to reduce such expenses wherever possible. One way is by sending all numbers at the rate of one cent per pound instead of one cent per four ounces. Thus tardy renewers have to wait until the next issue for their back numbers.

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Preliminary List of Heterocera Captured in and around St. Louis, Missouri.

Sphingidae to Sesiidae Arranged According to Dyar's List of North American Lepidoptera.

Compiled by PAUL A. SCHROERS, St. Louis, Mo.

(Continued from Vol. XXIV, page 463.)

2810. Catocala lacrymosa *Guén.*
a. ulalume *Str.*
b. paulina *Edwards.*
c. emilia *Edw.*
d. evelina *French.*
e. zelica *F.*
2811 viduata *Guen.*
2813 vidua *Sm. & Ab.*
2814 dejecta *Str.*
2815 retecta *Gr.*
a. luctuosa *Hulst.*
2816 flebilis *Gr.*
2817 robinsonii *Gr.*
a. curvata *Fr.*
2819 obscura *Str.*
a. simulatilis *Gr.*
2820 residua *Gr.*
2821 insolabilis *Guen.*
2822 angusi *Gr.*
a. lucetta *Edw.*
2823 judith *Str.*
2827 cara *Guen.*
a. sylvia *Edw.*
b. carissima *Hulst.*
2828 amatrix *Hüb.*
a. nurus *Walk.*
2829 marmorata *Edw.*
2841 junctura *Walk.*
2848 unijuga *Walk.*
2857 parta *Guen.*
2858 coccinata *Gr.*
2864 ultronia *Hüb.*
a. celia *Edw.*
b. mopsa *Edw.*
c. adriana *Edw.*
2865 Catocala ilia *Cr.*
a. zoe *Behr.*
b. uxor *Guen.*
c. osculata *Hulst.*
2866 innubens *Guen.*
a. flavidalis *Gr.*
b. hinda *Fr.*
c. scintillans *Gr.*
2867 nebulosa *Edw.*
2868 piatrix *Gr.*
2869 dyonisa *H. Edw.*
2870 neogama *Sm. & Ab.*
a. communis *Gr.*
b. snowiana *Gr.*
2871 subnata *Gr.*
2872 cerogama *Guen.*
2873 paleogama *Guen.*
a. annida *Fager.*
b. phalanga *Gr.*
2874 consors *Sm. & Ab.*
2881 illecta *Walk.*
2882 serena *Edw.*
2887 habilis *Gr.*
a. basalis *Gr.*
2888 clintonii *Gr.*
2891 nuptialis *Walk.*
2892 polygama *Guen.*
a. crataegi *Saunders.*
b. mira *Gr.*
2894 amasia *Sm. & Ab.*
a. virens *French.*
2898 fratercula
d. timandra *H. Edw.*
e. hero *H. Edw.*
f. gisela *Meyer.*
2900 praeclara *Gr. & Rob.*

2901 dulciola *Gr.*
2902 grynea *Cr.*
2903 alabamae *Gr.*
2904 titania *Dodge.*
2906 minuta *Edw.*
a. parvula *Edw.*
2907 amica *Hüb.*
a. lineella *Gr.*
b. nerissa *H. Edw.*
2911 Euparthenos nubilis *Hüb.*
a. apache *Poling.*
2915 Phoberia atomaris *Hüb.*
2920 Panopoda rufimargo *Hüb.*
a. carneicosta *Guen.*
b. roseicosta.
2921 Parallelia bistriaris *Hüb.*
2922 Agnomonia anilis *Dr.*
2923 Remigia repanda *Fab.*
2940 Phurys vinculum *Guen.*
2946 Celiptera frustulum *Guen.*
2953 Strenoloma lunilinea *Gr.*
2962 Trama detrahens *Walk.*
2971 Yrias clientis *Gr.*
2973 repentis *Gr.*
2977 Zale horrida *Hüb.*
2979 Pheocyma lunifera *Hüb.*
2983 Ypsia undularis *Dr.*
2986 Homoptera lunata *Dr.*
a. edusa *Dr.*
3006 Erebus odora *L.*
3007 Thysania zenobia *Cr.*, one specimen, by Mr. L. Schnell.
3012 Epizeuxis lubricalis *Geyer.*
3013 denticulalis *Har.*
3019 Zanclognatha laevigata *Gr.*
ochreipennis *Gr.*
3039 Chytolita morbidalis *Guen.*
3058 Palthis angulalis *Hüb.*
3059 asopialis *Guen.*
3062 Salia interpuncta *Gr.*
3066 Bomolacha bijugalis *Wlk.*
3067 scutellaris *Gr.*
3068 albalinealis *Wlk.*
3069 madefactalis *Guen.*
3073 deceptalis *Wlk.*
3079 Platypena scabra *Fab.*
3080 Hypena humuli *Har.*

NOTODONTIDAE.

3091 Apatelodes angelica *Gr.*
3092 Melalophia apicalis *Walk.*
3098 Datana ministra *Dr.*
3100 angusi *Gr. & Rob.*
3108 integerrima *Gr. & Rob.*
3111 Hypereschra stragula *Gr.*
3112 georgica *Her.-Sch.*
3113 tortuosa *Tepper.*
3118 Pheosia dimidiata *Her.-Sch.*
3121 Lophondonta angulosa *Pack.*
3123 Nadata gibbosa *Sm. & Ab.*
3125 Symmerista albifrons *Sm. & Ab.*
3133 Heterocampa obliqua *Pack.*
3137 manteo *Doubleday.*
3142 bilineata *Pack.*
3143 Misogada unicolor *Pack.*
3145 Ianassa lignicolor *Walk.*
3148 Schizura ipomoeae *Doubleday.*
3149 concinna *Sm. & Ab.*
3153 badia *Gr.*
3162 Harpyia cinerea *Walk.*
3165 Fentonia marthesia *Cr.*
3170 Ellida caniplaga *Wlk.*

THYATIRIDAE.

3180 Euthyatira pudens *Guen.*

LIPARIDAE.

3189 Heterocampa vetusta *Boisd.*

3190 leucostigma *Sm. & Ab.*
3192 definita *Pack.*
3196 Porthetria dispar *L.*, one specimen.
3198 Doa ampla *Gr.*
3222 Heteropacha rileyana *Har.*

PLATYPTERYGIDAE.

3226 Oreta rosea *Walk.*
3229 Drepana arcuata *Walk.*

GEOMETRIDAE.

3232 Dyspteris abortivaria *Her.-Sch.*
3234 Nyctobia limitata *Wlk.*
3248 Eudule mendica *Wlk.*
3260 Nannia refusata *Wlk.*
3262 Heterophleps triguttaria *Her.-Sch.*
3294 Tephroclystis absinthiata *Clerk.*
3323 Eucymatoge intestinata *Guen.*
3332 Euchoeca albovittata *Guen.*
3340 Hydria undulata *L.*
3348 Eustroma diversilineata *Hüb.*
3354 atrocolorata *Gr.*
3359 Rheumaptera hastata *L.*
3370 Percnoptilotia fluviata *Hüb.*
3374 Mesoleuca lacustrata *Guen.*
3416 Triphosa dubitata *L.*
3436 Marmopteryx marmorata *Pack.*
3468 Haematopsis grattaria *Fab.*
3469 Erastria amaturaria *Wlk.*
3480 Cosymbia lumenaria *Hüb.*
3486 Synclis alabastaria *Hüb.*
3530 Eois ossularia *Hüb.*
3546 inductata *Guen.*
3550 sideraria *Guen.*
3561 Chloroclamys chloroleucaria *Gr.*
3581 Synchlora liquoraria *Guen.*
3604 Eufidonia notataria *Wlk.*
3614 Mellila inextricata var. a. xanthometata *Wlk.*
3651 Sciagrapha heliothidota *Pack.*
3664 mellistrigata *Gr.*
3667 Philobia enotata *Guen.*
3722 Cymatophora tenebrosata *Hulst.*
3747 Sympherta tripunctaria *Pack.*
3803 Paraphia subatomaria *Wood.* a. unipuncta *Haw.*
3814 Tornos scolopacinarius *Guen.*
3838 Selidosoma humarium *Guen.*
3850 Cleora pampinaria *Guen.*
3858 Melanolophia canadaria *Guen.*
3862 Ectropis crepuscularia *Denis.*
3864 Epimecis virginaria *Cr.*
3865 Lycia ursaria *Wlk.*
3867 cognataria *Guen.*
3908 Therina endropiaria *Gr. & Rob.*
3911 fervidaria *Hüb.*
3916 Eugonobapta nivosaria *Guen.*
3922 Ennomos subsignarius *Hüb.*
3923 magnarius *Guen.*
3925 Xanthotype crocataria *Fab.*
3932 Plagodis emargataria *Guen.*
3934 Hyperitis amicaria *Her.-Sch.*
3939 Ania limbata *Haw.*
3944 Gonodontis duaria *Guen.*
3956 Euchlaena obtusaria *Hüb.*
3961 amoenaria *Guen.*
3957 effectaria *Wlk.*

3965 pectinaria *Denis.*
4007 Caberodes confusaria *Hüb.*
4011 Tetracis crocallata *Guen.*
4013 Sabulodes sulphurata *Pack.*
4026 transversata *Dr.*
4028 Abbottana clemataria *Sm. & Ab.*

LACOSOMIDAE.
4059 Cicinnus melsheimeri *Har.*
4060 Lacosoma chiridota *Gr.*

PSYCHIDAE.
4065 Thyridopterix ephemeraeformis *Hw.*

COCHLIDIIDAE.
4080 Euclea chloris *Her.-Sch.*
4092 Prolimacodes scapha *Har.*
4094 Cochlidon biguttata *Pack.*
4096 Y-inversa *Pack.*

MEGALOPYGIDAE.
4108 Carama cretata *Gr.*
4110 Lagoa crispata *Pack.*

THYRIDAE.
4131 Thyris maculata *Har.*
4147 Prionoxystus robiniae *Peck.*
4160 Hypopta anna *Dyar.*

SESIIDAE.
4162 Melittia satyriniformis *Hüb.*
4188 Aegeria apiformis *Clerk.*
4221 Sesia acerni *Clemens.*

A Recently Described Psyllid from East Africa (Hemip.).

By D. L. CRAWFORD, Department of Entomology, Cornell University, Ithaca, New York.

Specimens of an interesting Psyllid affecting fig trees in East Africa, submitted to the writer by Dr. L. O. Howard for determination, prove to be identical with a species recently described by Robert Newstead, from Nyasaland. A new genus, *Pseudcriopsylla*, was erected by Newstead for the species, which he called *nyasae* n. sp. There is a very close resemblance between this African species and a species described earlier, from the Island of Formosa, by Kuwayama. The relationship is so close, moreover, that the two species cannot be considered as generically distinct. The description of *Macrohomotoma* Kuwayama was apparently overlooked by Newstead, for otherwise a new genus would not have been erected. *Pseudcriopsylla* Newstead may, therefore, be considered a synonym of *Macrohomotoma* Kuwayama.

MACROHOMOTOMA Kuwayama.

Kuwayama, S. Trans. Sapporo Nat. Hist. Soc. II:179, 1907. *Pseudcriopsylla* Newstead, R. Bul. of Ent. Research, II:105, 1911.

Body large, robust; head as broad as thorax, deflexed; vertex broad, more or less cleft in front; genal cones entirely wanting; frons not covered by genae, but visible as a narrow sclerite from front ocellus to clypeus; front ocellus above; antennae short, about as long as width of head. Thorax large; pronotum very short. Forewings large, hyaline, transparent, acute at apex; pterostigma unusually large, elliptical; marginal cells very large; branching of veins similar in type to *Carsidara*.

Type of genus: *Macrohomotoma gladiatum* Kuwayama (loc. cit., p. 180).

The genus shows a distinct relationship to *Carsidarinae*, although the head is not so deeply cleft in front and there is no basal spur on the hind tibiae, as there is in many of the other genera placed in this subfamily (Crawford—Pomona Journ. Ent., III, p. 381, 1911).

Synopsis of the Species.

A. Cubital vein before its furcation as long as stem of media and cubitus; pterostigma black apically; female genital segment very short. .....*M. gladiatum* Kuway.

AA. Cubitus exceedingly short before furcation, many times shorter than stem of media and cubitus; pterostigma not black apically; female genital segment long and slender. ....*M. nyasae* (Newst.)

Macrohomotoma nyasae (Newstead).

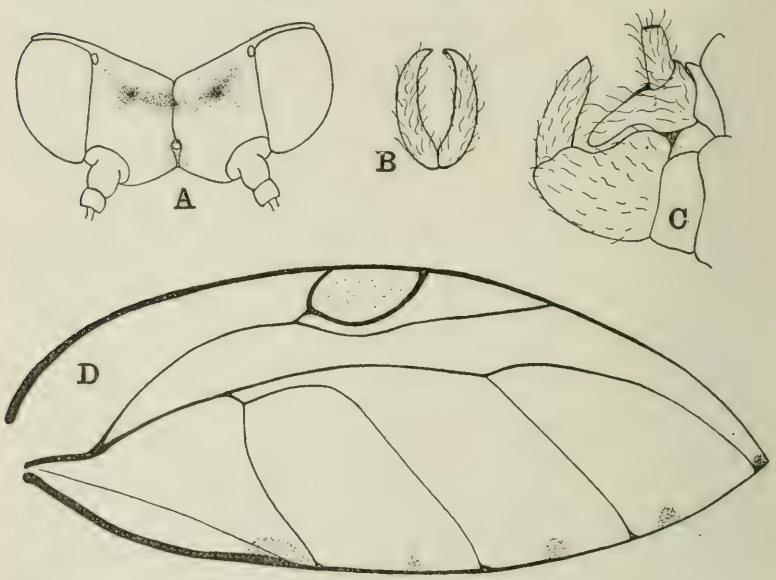
Syn.—Pseuderiopsylla nyasae Newstead—loc. cit. p. 105, 1911.

Length of body (male) 2.9 mm.; (female) 3.3 mm.; length of forewing 5.2 to 5.6 mm. General color reddish brown to chocolate brown; dorsal portion of scutellum and posterior part of dorsulum, vertex, male genitalia, and legs, lighter brown to ochraceous; venter of abdomen whitish.

Head very broad, as broad as thorax, greatly deflexed; vertex nearly twice as broad as long, coarsely punctate, with a deep fovea on each side of median line posteriorly and a deep sulcus connecting them; front margin somewhat cleft, but not as much as in *Carsidara*; front ocellus easily visible from above. Genal cones entirely wanting; frons narrowly visible between genae. Antennae slender, about as long as width of head, black at tip.

Thorax very large, broad and strongly arched; pronotum very short, sometimes mostly concealed behind posterior margin of head; dorsulum longer than broad; metanotum produced at posterior end

into three erect contiguous, tuberculous processes. Legs short, thick; hind tibiae with four black spines at apex. Forewings very large, two and a half times as long as broad, acutely pointed at apex, costal margin more strongly arched; marginal cells unusually large, subequal; Cu very short; pterostigma more opaque than rest of wing



Macrohomotoma nyasae (Newstead).—A, head, dorsal view; B, forceps of male, posterior view; C, male genitalia, lateral view; D, forewing.

surface; primary furcation very near to base of wing. (I find no traces of the supernumerary vein between Rs and the pterostigma, as shown by Newstead. Either he examined an anomolous wing or else examined the wing *on* the insect and mistook the costa of the hind wing beneath for this vein.) Hind wings small, transparent.

Abdomen large; *male* anal valve about as long as forceps, cylindrical and truncate at apex, with the anus occupying most of truncate surface;—with a long, lateral, sinuate prolongation extending caudad to base of forceps (cf. fig. C). Forceps long, stout, acutely pointed at apex, carinate at base on outside; pubescence conspicuous. *Female* genital segment long and very slender, longer than rest of abdomen, dorsal valve longer than ventral, both acute at tip.

Described from one male and one female, collected at Lourenço Marquez, Portuguese East Africa (C. W. Howard), on leaves and fruit of *Ficus sp.*, July 13, 1908. A thick, white,

floccose substance is excreted by the nymphs and adults and renders their presence very conspicuous. These floccose filaments are unusually long and are sticky to the touch.

Newstead described this species as affecting a native fig ("Kachire"), on the northwest shore of Lake Nyasa, Nyasaland, Africa. Although I have not seen Newstead's specimens, there can be little doubt but that the specimens before me are identical with those from Nyasa.

Nymph: Rather circular in outline, flattened, strikingly colored: brownish, with a median dorsal white stripe from anterior end to base of abdomen and a transverse white band on meso- and metathorax, connecting with a white stripe around the inner margin of wing pads. Abdomen basally with four narrow, transverse black bands, and caudad with a bilateral pair of brown rings with a brown spot in the center of each. Margin of body with slender hairs; surface sparsely hairy.

Length 1 to 2.5 mm.

The nymphs excrete and cover themselves with a dense, white, flocculent, sticky substance, as noted above.

Eggs:—"Pale yellow, when empty pearly white. They are laid upon the surface of the leaves and are protected by a layer of white and rather densely felted wax, the latter extending beyond eggs for some considerable distance." (Newstead).

The Latest Work of Prof. O. M. Reuter.

In *Science* for January 9, 1914, Prof. W. M. Wheeler has a two-page notice of Prof. Reuter's *Lebensgewohnheiten und Instinkte der Insekten bis zum Erwachen der sozialen Instinkte*. This is a German translation from the Swedish manuscript and was revised by the author shortly before his death, to which regrettable event attention was called in the NEWS for January.

Memorials of Alfred Russel Wallace.

Science states that it is proposed to place a memorial to Alfred Russel Wallace in Westminster Abbey, a statue or bust in the British Museum of Natural History, and a portrait in the Royal Society's gallery. Contributions for these purposes may be sent to the Union of London and Smith Bank, Holborn Circus, London, E. C.

Notice to Authors.

Authors publishing entomological articles in non-entomological journals, who desire to have such articles noted in our current literature list, will do well to send copies of them to ENTOMOLOGICAL NEWS, 1900 Race St., Philadelphia, Pa. After note has been made of the same, they will be deposited in the library of the American Entomological Society.

Standards of the number of eggs laid by Spiders (Aran.)—III.*

Being Averages Obtained by Actual Count of the Combined Eggs of Twenty (20) Depositions or Masses.

By A. A. Girault, Nelson (Cairns), North Queensland, Australia.

3. Uloborous geniculatus Oliv.

No.	Date counted—1912	No. counted per mass	Successive Totals	Av. per Egg Mass	Max.	Min.	Range
1	May 1	140.	140.	140.	140.		
2		101.	241.	120.			
3		108.	349.	113.			
4		70.	419.	105.			
5		68.	488.	98.			
6		78.	566.	94.			
7		107.	673.	96.			
8		127.	800.	100.			
9		97.	897.	100.			
10		73.	970.	97.			
11		134.	1104.	100.			
12		111.	1215.	101.			
13	May 5	94.	1309.	101.			
14		108.	1417.	101.			
15		89.	1506.	100.			
16		71.	1577.	99.			
17		60.	1637.	96.		60.	80
18	May 6	87.	1724.	96.			
19		82.	1806.	95.			
20		119.	1925.	96.			
20			1925.	96.	140.	60.	80

The above eggs were obtained from a number of nests in a private residence used as a field laboratory on the edge of the little hamlet of Nelson (Cairns District), North Queensland, Australia, the first week in May, 1912. The species was kindly identified for me by Mr. W. J. Rainbow, of the Australian Museum, Sydney. Three egg bags to the nest seem to be the average per female, but the following observations show that as many as six may be deposited. A female kept under observation from April 30, 1912 (subpended in an isolated web across part of the frame of a rude ladder on the back veranda) made a fresh cast a day or two previously and another on May 10, so that she became mature not until the night of

* For the first two of this series, see Ent. News, XXII, pp. 461; XXIV, p. 213.

May. 9. Mating was not observed. On May 29 (early A. M.), or about twenty days after reaching maturity, the first cocoon of eggs was found suspended in the nest; and the second very early in the morning of June 10. Early in the morning of June 21 the third mass was deposited and the fourth about the same time July 4. The four cocoons were then suspended in the nest above the center in one corner, the first above and the other three in a nearly straight line below it, all taken together forming a triangle of which the second made the middle of the base directly below the first, the triangle's apex. The fifth mass was deposited during the night of July 30-31, and the sixth August 26-27. The female disappeared on September 6, 1912. All of these eggs were fertile.

Nos. 4 and 5, 6 and 7, 8 and 9, 15 and 16, and 18 and 19 (in the table) were from the same nest, each couple being the second and third bags from the respective females, the first having hatched; No. 11 was the fourth mass from a nest, the three others having hatched; the other numbers were first or second masses.

The number of eggs which may be laid by some spiders is illustrated by the contents of a medium-sized, hemispherical egg mass, covered with a silk cap found placed flat against a board at Paris, Texas, in March, 1904. It contained two thousand one hundred and three compact, round, yellow eggs. Unfortunately the species was unknown.

Origin of Oligotropy of Bees (Hym.).*

By Charles Robertson, Carlinville, Illinois.

In this journal, volume 24: 104, Mr. Lovell replies to some criticisms made in the number for December, 1912, Vol. 23: 457.

The statement about *Epeolus*, quoted from the *Botanical Gazette* 28: 35, July, 1899, was corrected two months afterward on page 215 of the same journal, where it is also re-

[*This article was received in July, 1913, but has not been published at an earlier date, owing to the large number of manuscripts sent in before it.—Editor.]

corded that *Triepeolus donatus* is an inquiline of *Entechnia taurea*. Lovell states that this bee visits the Compositae exclusively. Of ten local species of *Triepeolus*, including *T. donatus* and excluding one of only one visit, none are exclusive visitors of Compositae.

Lovell is correct in saying that in my view a bee is oligotropic everywhere or nowhere. The whole matter is an inference from the fact that a bee has been observed collecting pollen on a certain flower and has not been found doing so on any other. The force of the latter statement depends upon the presumption that the observer would know whether a bee collects pollen from another flower or not. In 1899 I suggested fifty-three bees as oligotropic. I had observed 3670 visits of 194 nest-making bees to about 400 different kinds of flowers, so there was some basis for the presumption that if the bee were not oligotropic I would know it. Nevertheless, from my own observations I have found it necessary to modify six cases and reject four. Lovell quotes my statement: "When the flowers upon which a bee depends becomes extinct or rare, the bee may disappear or be forced to resort to flowers which originally it did not visit." This may be true as a general statement, but I have never used it to support untenable cases.

The statement of Müller quoted from the *Fertilisation of Flowers* (not "Plants"), p. 570, has already been commented on in the *Bot. Gaz.* 32: 367, 1901. It only shows that Müller did not understand the flower-visiting habits of bees.

I do not accept the opinion: "Therefore the entomophilous flora of a region, as a whole, is not better pollinated because a part of the bees are oligotropic than it would be if they were all polytropic."

Lovell says: "The fact that so many bees are oligotropic to the Compositae would seem alone to refute the theory that this habit is an effort on their part to avoid competition by visiting different plant families." Observing that Lovell can not cite a passage where anyone has propounded such a theory, let us consider the Compositae oligotropes. In the *Can. Ent.* 42: 327, I have stated that of twenty exclusive both in their pollen and nectar visits the majority are oligotropes of Com-

positae and say: "It is not so surprising that some of these are exclusive when we consider that at their maximum the Compositae form 34 per cent. of the indigenous flowers."

At Carlinville the phenological positions of the indigenous Compositae and their oligotropes are:

	Apr.-May	Jn.-July	Aug.-Sept.	Oct.
Compositae	10.8	57.6	86.9	42.3
Oligotropes	7.5	47.5	90	50

It may be that some of these originated under the maximum of the Compositae. But it is a little too much to assume that they originally had a short flight, turned to the Compositae and happened to fall into a nice phenological correlation. My view is that they have a short flight and form their maximum under that of the Compositae because they are oligotropes. They are the most abundant at the time when competition would be the least. Whenever competition becomes the most severe at this point, it will be an advantage to change food habits, or fly earlier or later.

That the pressure of competition has already reached a severe stage is indicated by *Melissodes* and at least some genera of Panurgidae. In my opinion *Melissodes* is typically a genus of Compositae oligotropes and the polytropic species, as well as those which are oligotropes of other flowers, were originally developed from oligotropes of Compositae. The same may be true of the Panurgidae, but I am doubtful about it except in some of the genera.

But it is misleading to speak as if Compositae oligotropes were all competitors. Some do not occur at the same time as others; probably the flight of no two exactly coincides. Moreover they are not all oligotropes of the same flowers. They fall into the following fourteen more or less non-competitive sets. Where two tribes are mentioned most of the visits are to the first:

Krigia: Pterandrena krigiana; *Boltonia*: Perditella boltoniae; *Vernonia*: Melissodes vernoniana, vernoniae; *Cnicus*: M. cnici; *Coreopsis palmata*: M. coreopsis; *Helianthus*: Halictoides marginatus; *Asteroideae*: Colletes armatus, Andrena nubecula, Pterandrena asteris, solidaginis, Pseudopanurgus

compositarum, M. asteris; *Helianthoideae*: Sayapis pollicaris, pugnata, Pterandrena aliciae, pulchella, rudbeckiae, Pseudopanurgus albitarsis, rudbeckiae, labrosus, labrosiformis, rugosus, M. illinoensis; *Asteroideae and Helenioideae*: M. simillima; *Asteroideae and Helianthoideae*: Colletes americanus, Pseudopanurgus asteris, solidaginis, Perdita 8-maculata, M. autumnalis; *Helianthoideae and Asteroideae*: Ashmeadiella bucconis, Megachile 6-dentata, Pterandrena helianthi, Calliopsis coloradensis, M. agilis; *Helianthoideae and Cynarioideae*: Sayapis pugnata, M. coloradensis; *Three tribes*: Colletes compactus, Gnathosmia georgica, M. trinodis, Sayapis sayi; *Four tribes*: M. boltoniae.

Lovell says: "How has the oligotropic habit originated? Mr. Robertson believes that it is the result of an effort on the part of the different species to avoid competition. I hold that it has arisen because of the advantage gained coupled with a short term of flight." He also says: "Accessory factors are small size, time of flight, weak flight, vicinity of nests, and the number of bees."

In the *Bot. Gaz.* 28: 29, 30, 1899, I have recognized a short flight as an important condition of oligotropy and have practically excluded bees of long flight from the discussion. The use of the words "an effort" in every reference to my views is not justified. I have never used that expression or any words implying that idea. My view is that the bee fauna is all that the flora will support, that there is constant competition between the bees, and that natural selection favors those which are the most diversified, *i. e.,* the least competitive in their food habits.

Compared with bees which fly all season the oligotropes have a short flight, but that they, as compared with their relatives, originally had a short flight there is no evidence. And the general statement that they have a short flight is misleading. Compare:

	Less than 51 days	51-100 days	Over 100 days
Oligotropes	30	36	7
Polytropes	18	39	9

The average flight is shorter and there are more of them

with a short flight. In these cases there is no evidence that the oligotropy is the result of the short flight. On the other hand there are enough certain cases to establish the presumption that the short flight is a result of the oligotropy.

Oligotropic bees are no smaller than their polytropic relatives, and the percentage of small bees is no greater than among the polytropes. In my neighborhood 38% of the oligotropes and 37% of the polytropes are large.

The long-tongued oligotropes and their relatives are among the swiftest of bees, far surpassing *Bombus* in this respect. Lovell seems to regard small size as an indication of a weak flight. At any rate, he speaks of *Andrena illinoensis* as "a small bee, not likely to fly far," and of *Halictoides novaeangliae*: "They are small bees with a weak flight." This requires proof. When the proportions are the same there is a probability that a small bee has a stronger flight than a large one.

I have shown that *Emphor bombiformis* nests in the neighborhood of the *Hibiscus* on which it depends. The proximity of the nests and food plants is a result rather than a determining condition of the oligotropy.

At Carlinville the maximum of Compositae is in August and September. Of the nectar flowers observed by me in these two months seventy-two, 32%, are Compositae. There are fifteen species of inquiline bees flying late and forming a maximum under that of the Compositae. They make from three to thirty visits and an average of fifteen. On the average they make visits of 6% to a flora composed of 32% of Compositae. They seem to fill the conditions required by Lovell's theory: a short flight of 60 days average determined by the fact that they are inquilines of bees most of which are evidently oligotropes of Compositae. a rather weak flight, and probably come from nests conveniently located with reference to the Compositae. They might easily confine 30 visits, or an average of 15, to the 72 Compositae. Only three species, with an average of 5 visits, confine themselves to the Compositae, while twelve species, with an average of 17 visits, do not. The exclusive ones are *Epeolus autumnalis* 7, *Holonomada vincta*

4, *H. placida* 4. The best of these shows eight less than the average and may be regarded as fragmentary.

If a bee limits itself to a given flower, it gains the immediate advantage of being able to anticipate other bees in their visits to the chosen plant. It may increase this advantage by locating its nests near the flowers. To humanize, it may concentrate its attentions upon the flowers so as to get to them first, learn how to manipulate the pollen better than other bees, and finally develop special structures which will increase the advantage.

I have pointed out that some oligotropes which collect large pollen have loosely plumose scopae which are better adapted to collect and hold the large grains, while some others which collect the fine pollen of Compositae have densely plumose scopae.

Anthedon compta, an oligotrope of *Oenothera*, whose pollen grains are hard to collect on account of being connected by threads, has scopae of long simple bristles quite different from its nearest relatives. After doing the best it can on the flower, it goes to the stem and turns head downwards so as to work the cobwebby pollen into its scopae. Other bees collect the pollen, but *Anthedon* surpasses them all in the facility with which it does so.

The anthers of *Verbena* are included in a slender tube and above them is a circle of hairs as if intended to prevent the pollen from being extracted. Ordinary bees can only collect the pollen which adheres to their proboscides. *Verbenapis verbenae* has its front tarsi provided with curled bristles. When collecting pollen the bee thrusts both front legs into the tube of the corolla and drags out the pollen with its front tarsi.

There are 223 indigenous nest-making bees. One species, flying throughout the season and fitted about like *Apis*, except for flowers of unusual construction, might collect nearly as much pollen and support nearly as many individuals as all of the 223 together. It would be to the advantage of this bee to become as polytropic as possible, and, as the number of individuals increased, to extend its visits to the most difficult

and inconvenient flowers. It would be distinctly disadvantageous for it to limit itself to some particular flowers and exceedingly unlikely that it would do so. The ecological specialization exhibited by *Anthedon, Verbenapis* and other oligotropes is a fairly certain indication of the pressure of competition.

I think that the long-tongued pygidial bees were developed as competitors of the bumblebees, the first on the ground and the most polytropic of bees. I think this explains why they have a comparatively short and rapid flight and so frequently oligotropic habits. In a similar way the Andrenidae, Panurgidae and related groups which are so often oligotropic were probably preceded by the Halictidae, the most polytropic of short-tongued bees. There are forty species of Halictidae flying throughout the season. In the spring there are the females which have passed through the winter, but later both sexes of the regular brood are flying so that the maximum is late. There are ninety-four other short-tongued bees occupying the same region. It would be a hard matter for all of these bees to fly throughout the season and compete with the Halictidae. Instead they have short times of flight and are distributed so that not more than fifty-two are flying in any month and these only in the spring when the Halictidae are least abundant. And these bees are the least abundant when the Halictidae are the most abundant and most active. The early maximum, the short flight, the non-competitive phenological distribution, and the frequently oligotropic habits indicate that these bees have managed to hold their own only by dividing up the remaining field and occupying the most favorable corners left by their perennial polytropic competitors.

To the list of local oligotropes add: *Petalostemon violaceus*: Colletes albescens, robertsonii; *Strophostyles angulosa*: Megachile strophostylis; *Papilionaceae*: Meg. generosa, Gnathodon georgicus, Anthidium psoraleae, Synalonia atriventris, fuscipes; *Salix*: Andrena salicacea, macoupinensis; *Nymphaeaceae*: Chloralictus nymphaearum; *Cassia chamaecrista*: Melissodes atripes; *Ipomoea pandurata*: Cemolobus ipomoeae.

ENTOMOLOGICAL NEWS.

PHILADELPHIA, PA., FEBRUARY, 1914.

The Influence of Insects on Civilization.

The discoveries of recent years of the parts played by insects in the transmission of diseases have demonstrated, as never before, how civilization may be retarded by creatures formerly so commonly despised as unworthy of serious attention. The Panama Canal, the health of Italy, of India, of Havana, of Rio de Janeiro, of New Orleans, are now familiar examples of the influence of the hexapods on human prosperity. Sir Ronald Ross has gone so far as to suggest that the downfall of Greece was largely due to malaria, and malaria means the *Anopheles* mosquito, a conqueror greater than Alexander. No less striking is the effect produced by insects which in large numbers, through a series of years, devastate a staple agricultural product.

Dr. W. E. Hinds, of the Alabama Agricultural Experiment Station, in a paper on "County Organization in the Boll Weevil Campaign," read at the recent Atlanta meeting of the American Association of Economic Entomologists, considered that the spread of the boll weevil eastward through the Southern States has been more of an advantage than a loss to the human population, inasmuch as it has operated to diminish the deleterious practice of planting cotton year after year on the same ground, to encourage the habit of rotation of crops and to bring about the necessity for greater co-operation between the planters and other members of the community, a co-operation which has not stopped with measures to combat the weevil but has subsequently extended to those for bettering the community in other ways.

We find no entomological entries in the indexes to Buckle, but the future historian of civilization cannot neglect the influence of insects on the processes he attempts to describe.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded. The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published, and are all dated the current year unless otherwise noted, always excepting those appearing in the January and February issues of the News, which are generally dated the year previous.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of systematic papers are all grouped at the end of each Order of which they treat, and are separated from the rest by a dash.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington.

3—The American Naturalist. **4**—The Canadian Entomologist. **10**—Nature, London. **11**—Annals and Magazine of Natural History, London. **13**—Comptes Rendus, Societe de Biologie, Paris. **14**—Proceedings of the Zoological Society of London. **18**—Ottawa Naturalist. **19**—Horae Societatis Entomologiae Rossicae. **21**—The Entomologist's Record, London. **22**—Zoologischer Anzeiger, Leipzig. **28**—Archives d'Anatomie Microscopique, Paris. **38**—Wiener Entomologische Zeitung. **40**—Societas Entomologica, Zurich. **44**—Verhandlungen, K. k. zoologisch-botanischen Gesellschaft in Wien. **50**—Proceedings of the U. S. National Museum. **59**—Sitzungsberichte, Gesellschaft der naturforschenden Freunde, Berlin. **64**—Annalen, K. k. Naturhistorischen Hofmuseums, Wien. **68**—Science, New York. **69**—Bolletino, Societa Italiana Entomologica. **79**—La Nature, Paris. **81**—Biologisches Centralblatt, Erlangen. **84**—Entomologische Rundschau. **87**—Bulletin, Societe Entomologique de France, Paris. **89**—Zoologische Jahrbucher, Jena. **92**—Zeitschrift fur wissenschaftliche Insektenbiologie. **97**—Zeitschrift fur wissenschaftliche Zoologie, Leipzig. **123**—Bulletin, Wisconsin Natural History Society, Milwaukee. **160**—Internationale Revue der Gesamten Hydrobiologie und Hydrographie, Leipzig. **161**—Proceedings, Biological Society of Washington. **164**—Bulletin, University of Kansas, Lawrence. **166**—Internationale Entomologische Zeitschrift, Guben. **179**—Journal of Economic Entomology. **182**—Revue Russe d'Entomologie, St. Petersburg. **184**—Journal of Experimental Zoology, Philadelphia. **186**—Journal of Economic Biology, London. **191**—Natur, Halbmonatschrift fur alle Naturfreunde. **193**—Entomologische Blatter, Cassel. **195**—Bulletin, Museum of Comparative Zoology,

Cambridge, Mass. **198**—Biological Bulletin, Marine Biological Laboratory, Woods Hole, Mass. **200**—Bulletin Scientifique de la France et de la Belgique, Paris. **216**—Entomologische Zeitschrift, Frankfurt a. Main. **239**—Annales, Biologie Lacustre, Brussels. **251**—Annales, Sciences Naturelles, Zoologie, Paris. **264**—Boletin del Ministerio de Agricultura, Buenos Aires. **278**—Annales, Societe Zoologique Suisse et du Museum d'Histoire de Geneve, Revue Suisse de Zoologie. **322**—Journal of Morphology, Philadelphia. **324**—Journal of Animal Behavior, Cambridge, Mass. **327**—Scientific Memoirs by Officers of the Medical and Sanitary Departments of the Government of India (New Ser.), Calcutta. **365**—Collections Zoologiques du Baron Edm. de Selys Longchamps, Bruxelles. **367**—2nd International Entomological Congress. **368**—The Monthly Bulletin of the State Commission of Horticulture, Sacramento, Cal. **369**—Entomologische Mitteilungen, Berlin-Dahlem. **397**—Pfluger's Archiv fur die Gesammte Physiologie des Menschen und der Tiere, Bonn. **420**—Insecutor Inscitiae Menstruus: A monthly journal of entomology, Washington, D. C. **447**—Journal of Agricultural Research, Washington. **455**—Nachrichten von der Kongl. Gesell. der Wissenschaften zu Gottingen, Math.-Phys. Klas. **456**—Kosmos, Handweiser fur Naturfreunde, Stuttgart. **457**—Memoirs of the Coleoptera by Thos. L. Casey, Washington, D. C. **459**—Proceedings of the Thoreau Museum of Natural History, Concord, Mass. **450**—Ohio State University Bulletin, Columbus.

GENERAL SUBJECT. Et. Al.—We note that the "Quebec Society for the Protection of Plants from Insects and Fungous Diseases" has issued their fifth annual report, which is fairly well illustrated and will no doubt prove interesting to many. **Ballou, H. A.**—Some entomological problems in the West Indies, **367,** ii, 306-18. **Bethune-Baker, G. T.**—Resolution of the Entomological Society of London, **367,** ii, 93-96. **Brandt, P.**—Ueberwinterung der exotenpuppen, **216,** xxvii, 201-2. **Cosens A.**—Insect galls (Abstract of lecture), **4,** 1913, 380-84. **Dewitz, J.**—Die physiologie in der schadlingsforschung, **367,** ii, 234-44. **Doncaster, L.**—Sex-limited inheritance in insects, **367,** ii, 227-32. **Green, E. E.**—A plea for the centralization of diagnostic descriptions, **367,** ii, 216-19. **Handlirsch, A.**—Ueber einige beziehungen zwischen palaeontologie, geographischer verbreitung und phylogenie der insekten, **367,** ii, 248-70. **Hickson, S. J.**—Agricultural entomology in the University of Manchester (England), **10,** xcii, 355-6. **Hinds, W. E.**—Zoology and entomology at the Mass. Agric. College. Types deposited in the collection. (Amherst, Mass., 1911.) 52 pp.

Holmes, S. J.—Literature for 1912 on the behavior of lower invertebrates, **324,** iii, 389-400. **Horn, W.**—Protest gegen die zulassung von ausnahmen vom prioritatsgesetz, **367,** ii, 158-65. **Jonas, I.**—Praktische and dabei elegante schlupfund zuchtkasten, **84,** xxx, 127-130. **Kerremans, C.**—Les varietes doivent-elles etre nommees, **367,** ii, 187-91. **Kiefer, O.**—Photographische aufnahmen lebender insekten, **216,** xxvii, 197-8. **Kolbe, H. J.**—Die differenzierung der zoographischen elemente der kontinente, **367,** ii, 433. **Longinos Navas, R. P.**—Algunos organos de las alas de los insectos, **367,** ii, 178-86. **Mann, W. M.**—Literature for 1912 on the behavior of ants and myrmecophiles, **324,** iii, 429-455. **Meyer, H.**—Temperaturexperimente ohne kunstliche faktoren, **216,** xxvii, 193-94. **Natzmer, G.**—Die insektenstaaten, **216,** xxvii, 192-3 (cont.). **Olivier, E.**—Necessite de l'emploi du latin pour les descriptions, **367,** ii, 232-3. **Picado, C.**—Les bromeliacees epiphytes. Considerees comme milieu biologique, **200,** xlvii, 215-360. **Prout, L. B.**—On the place of figures in descriptive entomology, **367,** ii, 166-77. **Seitz, A.**—On the sense of vision in insects, **367,** ii, 198-204. **Speiser, P.**—Bemerkungen und notizen zur geographischen verbreitung einiger blutsaugenden insekten, **367,** ii, 205-7. **Szymanski, J. S.**—Zur analyse der sozialen instinkte, **81,** xxxiii, 649-658. **Taylor, J. W.**—Geographical distribution and dominance in relation to evolution and phylogeny, **367,** ii, 271-94. **Turner, C. H.**—Literature for 1912 on the behavior of spiders and insects other than ants, **324,** iii, 401-428. **Webster, F. M.**—Applied entomology for the farmer, **4,** 1913, 393-97. **Wheeler, G.**—Suggestions for securing simplification and permanency in nomenclature, **367,** ii, 97-108. **Wust, O.**—Die gallen und ihre erzeuger zu winterstudien, **216,** xxvii, 169.

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Chamberlin, R. V.—The lithobiid genera Nampabius, Garibius, Tidabius and Sigibius, **195,** lvii, 39-104. **Lahille, F.**—Nota sobre dos "Ixodes" de la Republica Argentina y la medicion de las garrapatas, **264,** xvi, 279-290. **Penther, A.**—Beitrag zur kenntnis amerikanischer skorpione, **64,** xxvii, 239-252.

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Bagnall, R. S.—A synopsis of the Thysanopterous family Aeolothripidae, **367,** ii, 394-97. **Ris, F.**—Libellulinen, Catalogue, Systematique et descriptif, **365,** Fasc. xvi, 965-1045. **Strobbe, R.**—Beitrag: Die Trichodectiden des Berliner Museum fur Naturkunde (Mallophaga), **59,** 1913, 365-383. **Williams, C. B.**—On two new sp. of Thysanoptera from the West Indies, **186,** viii, 209-215.

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HEMIPTERA. Horvath, G.—Etude morphologique sur la construction de l'elytre des Cicadides, **367,** ii, 422-32. **Jordan, K.**—On viviparity in Polyctenidae, **367,** ii, 342-50. **Marchal, P.**—Contribution a l'etude de la biologie des chermes, **251,** xviii, 153. **Stehli, G.**—Was ist gummilack? **456,** 1913, 456-58. **Theobald, F. V.**—Notes on the aphids of the cultivated peas, and the allied species of Macrosiphum, **367,** ii, 380-93.

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FABRE, POET OF SCIENCE, by DR. C. V. LEGROS, with a preface by J. H. FABRE. Translated by Bernard Miall. The Century Company, New York. 352 pp.

A number of books and articles on the life and works of this student and historian of the social insects have lately appeared. While well-known and appreciated for over half a century by his fellow-laborers in the vineyard, it is only comparatively recently that he has been discovered by the laity. What has happened is illustrated by his own words: "Moreover, it was not unimportant to warn the public against the errors,

exaggerations and legends which have collected about my person, and thus to set all things in their true light."

A common fault in biographies is that they are generally too laudatory, and in this book the author has not neglected his opportunities in this respect. However, if it be a fault, it is one that can be readily forgiven. The most interesting part of the book is the account of the life of a very modest man, who never took advantage of any untoward means of personal advancement, an enemy to all advertisement, depending solely on honesty of purpose and an effort to investigate the wonders of nature for the joy of the work and with the hope that mankind would benefit from his endeavors. The pleasure was in the work and the hope of material reward unseen and unlooked for.

The title of the work illustrates another feature in such books. Authors are prone to look so far into the poetic and aesthetic side that they develop a pronounced myopia in relation to the necessary technical and scientific part of all natural history investigation. On the other hand the true scientist and systematist sees the poetic and aesthetic aspect but also recognizes the absolute necessity of a scientific terminology. In fact, it is the aesthetic that starts him on the road. Our author makes Fabre appear restless as a user of the technical names of insects; yet use them he must. He also places him as an opponent of evolution, at least in part.

The lay reader of the book would suppose that all things related in the work were the discoveries of the "Poet of Science," yet all careful students of science know that most of the important facts and discoveries in nature and science have been cumulative and built up like concretions, or like the rolled snowball, that has had a push from many hands, before it reaches its final resting place. The book, however, is a most interesting one and was constructed by loving hands, in honor of a modest man who has done a noble work as a naturalist, entomologist and as a literary chronicler of our minute, but none the less mighty, little friends and enemies.—HENRY SKINNER. (*Advertisement.*)

TWO BOOKS ON ANIMAL ECOLOGY.

ANIMAL COMMUNITIES IN TEMPERATE AMERICA, AS ILLUSTRATED IN THE CHICAGO REGION. A Study in Animal Ecology by VICTOR E. SHELFORD, PH.D., of the Department of Zoology, The University of Chicago. Published for the Geographic Society of Chicago by the University of Chicago Press, Chicago, Illinois, October, 1913, 8vo., pp. xiii, 362. More than 300 figures, maps and diagrams. Price $3.00 net, postpaid $3.22.

GUIDE TO THE STUDY OF ANIMAL ECOLOGY, by CHARLES C. ADAMS, PH.D., Associate in Animal Ecology, Department of Zoology, University of Illinois, New York, The Macmillan Co., 1913, 12 mo., pp. xii, 183. 7 figures. Price $1.25.

The organization of the data for his book, Dr. Shelford tells us, "is the result of many attempts and failures which at times made the task seem hopeless," but as "here presented has in the main grown out of three lines of thought: (*a*) The physiology of organisms as opposed to the physiology of organs; (*b*) the phenomena of behavior, as illustrated by the studies of Loeb, much of the data of which can be related to natural environments; and (*c*) the organized comparable data of plant ecology, as set forth by Cowles and Warming" (pp. v, vi). "The definition of ecology, like that of any growing science, is a thing to be modified as the science itself is modified, crystallized and limited. At present, ecology is that branch of general physiology which deals with the organism as a whole, with its general life processes as distinguished from the more special physiology of organs, and which also considers the organism with particular reference to its usual environment" (p. 1). The point of view of the ecologist is illustrated by a concrete example on page 314.

The topics discussed, as worded in the chapter headings, are: Man and Animals, the Animal Organism and its Environmental Relations, The Animal environment, Its General Nature and Its Character in the Area of Study, Conditions of Existence of Aquatic Animals, Animal Communities of Large Lakes (Lake Michigan), of Streams, of Small Lakes, of Ponds, Conditions of Existence of Land Animals, Animal Communities of the Tension Lines Between Land and Water, of Swamp and Flood-Plain Forests, of Dry and Mesophytic Forests, of Thickets and Forest Margins, of Prairies; and a General Discussion. An Appendix suggests Methods of Study, in which emphasis is laid on the prime importance of experiments in the field, and some description of the apparatus used by the author in this new line of work is given (p. 322). A bibliography of 214 titles, almost exclusively in English (*cf.* p. v), and two indexes of authors and collaborators and of subjects, complete the book.

The treatment of the chapter topics, while not identical throughout, is sufficiently similar to be illustrated by a single chapter, for example, that on Animal Communities of Ponds. A brief introduction recalls the causes of the general interest in pond animals and the differences in pond bottoms. The origin and physical characteristics of the ponds in the area of special study are summarized. The communities of ponds are classified and discussed as the Pelagic and Pioneer (or Terrigenous Bottom) Formations and the Submerged Vegetation and Emerging Vegetation Associations.

The order of these four is that of the changes which ponds in general undergo, that of transformation from open water areas to swamps and eventually to dry land. The animals comprising each one of these ecological groups are, to a great extent, different and hence give each one a particular facies. The "characters" and "tendencies" of each

group are usually stated. Thus the characters of the Submerged Vegetation Association are "in being distinctly aquatic and also essentially independent of the bare bottom and of the surface," but "strictly dependent upon the vegetation for nesting places, shelter, etc. The mud minnow has been studied experimentally and shows avoidance of light." The tendencies of this same association are toward change: "This association, like all the others, is destined not to last; changes are taking place all the time. The chara is filling the pond at the rate of one inch a year and is making a fine soil for roots of other plants. As soon as the dense chara stage has existed for a time we find other plants, such as *Myriophyllum*, *Potamogeton*, and water lilies. As soon as these have become established we have the commencement of the next association." Finally, the succession of animal life in the same pond and the fate of the pond itself is considered and illustrated with tables showing the occurrences of species in ponds of different ages.

The terms "formation," "association" have here a technical ecological significance and, just as there is a well-known series of taxonomic groups of increasing magnitude (species, genus, family, order, class, phylum), so there is employed in this book a series of ecological groups, also of increasing magnitude (mos or mores, consocies, stratum, association, formation, extensive formation) which, with the exception of the first, bear not "the slightest relation" to the taxonomic groups. They are defined on pages 37 and 38 but, we suspect, with no greater exactness than has attended attempts at definition of the taxonomic groups.

As may be seen from the resumé of the Pond chapter, change in nature is emphasized throughout, the phenomena are dynamic, not static. Ecological succession is often met in different parts of the book, especially on pages 110-124.

An interesting discussion is that of the efforts of ecologists, geographers and climatologists to find a method of measuring the environment of organisms which shall include a number of the most important environmental factors. Dr. Shelford concludes that "the evaporating power of the air is probably the best index of environmental conditions of land animals" (p. 164).

The author is best known to entomologists by his excellent work on tiger beetles, but these are by no means the only insects employed in characterizing ecological groups. The Index of Subjects is so arranged that one can quickly ascertain what members of a given group are mentioned in the book. Thus under "Flies or diptera" are references to fifty-one names of families and genera, alphabetically arranged. Almost all of the orders of insects, some of the Arachnids and some Myriopods are represented, so that the book contains much of interest to the entomologist.

Owing to the numerous species cited and figured, the book is one

which would be willingly carried on field trips and excursions, if it were not so heavy. It has 362 plus xiii pages, 9½x6½ inches, and weighs 42 ounces. It is too heavy to read without a support, and too large and too heavy to go into any ordinary pocket. Much of its weight is due to the sized paper used throughout the volume for the sake of the half tones. When will all concerned in the manufacture of books see the absurdity and foolishness of this practice and, instead, give us a light weight paper for the text and limit the use of the heavy sort to interspersed plates to which the half tones shall be confined?

The entomologist will not find many data relating to his subject matter in Dr. Adams' book, but he will find many suggestions as to the kinds of work that is worth doing and as to the ways in which it may be done. Dr. Shelford's book is a contribution to the data of ecology and their organization. Dr. Adams is concerned with showing and developing the ecological "point of view, the importance of an understanding of explanatory processes and of the methods of scientific investigation. * * * At present ecology is a science with its facts out of all proportion to their organization or integration. There is thus an immediate need of integration and this above all requires a clear conception of the scientific method as a tool and independent thinking as well."

How different Dr. Adams' book is from Dr. Shelford's may be seen from the following list of chapter headings: I. Aim, Content and Point of View. II. The Value and Method of Ecological Surveys. III. Field Study. IV. The Collection, Preservation and Determination of Specimens. V. References to Scientific Technique. VI. References to Important Sources of Information on the Life Histories and Habits of Insects and Allied Invertebrates. VII. The Laws of Environmental Change or the "Orderly Sequence of External Nature." (The dynamic or process relations of the environment). VIII. The Laws of Orderly Sequence of Metabolism, Growth, Development, Physiological Conditions and Behavior, or "The Living Organism and the Changes which Take Place in It." (The dynamic or process relations of the animal). IX. The Continuous Process of Adjustment between the Environment and the Animal, with Special Reference to other Organisms. (The dynamic or process relations of animal associations and aggregations).

Special features of the book are the quotations from eminent biological writers, placed at the heads of chapters or of sections, indicating the value, importance or method of ecological inquiries, and the bibliographies. Indeed from page 84 (that is six pages from the beginning of chapter VII) to page 149 the book is almost entirely bibliography. It is thus, as the author hopes in the preface, "a useful source book." "Particular attention is called to the fact that it is not to be assumed

that the various authors [cited in the bibliographies] strive to make the points to which attention is here called; they may or may not do so. My aim is to call attention to the *utility* of the publications from the *standpoint* advocated throughout the book" (p. 84). The entomologist will note, from the preceding list of chapter headings, the utility to him of the references in chapter VI, but he should not fail to look through the other chapters as well.

Dr. Adams considers that there are three branches of ecology, individual, aggregate, and associational. The first deals with the ecology of a given individual or kind of animal, the second with the ecology of "hereditary or taxonomic units, as in a family community, or in genera, families, orders," etc. The third is devoted to "animals which are grouped or associated in the same habitats and environments. In this case the associates in a given association and habitat are considered as a unit, whose activities and interrelations and responses are investigated in the same manner as if it were a single animal" (pp. 3-5). It is associational ecology which Dr. Adams is anxious to advance and with which Dr. Shelford's book is concerned. "Applied or economic zoology and entomology are fundamentally more closely related to associational ecology than to any other phase of zoology, and * * * it would be to the great advantage of the students of such problems if they clearly understood this relation" (Adams, p. 29).

We heartily commend the same author when, in chapter II he says of non-ecological surveys, "The environment is considered as static, and not as a changing medium; it has no past or future, it has merely horizontal extension. The problem as to its *dynamic status*, whether in a condition of stress, in the process of adjustment, or in relative equilibrium, is not raised, or if it should be, it could not be handled. The student eager for new and little known species is not the one to study such relations, at least, as a rule, this has not been his practice. So long as the success of a day's work is measured by the length of the list of novelties secured, rather than by the quality and quantity of ecological relations discovered, such students and surveys will not contribute greatly to our knowledge of the economy of nature in the regions surveyed" (p. 31). And again, in the chapter on Field Study: "Early in field work one should learn that the collection of specimens is not the primary aim of excursions, that specimens are only *one* kind of facts, but that field study should be devoted to the accumulation of specimens, and to observations on the habits, activities, interrelations, and responses of animals, as well as to all facts, inferences, and suggestions, which are likely to be of use in the interpretation of the problems studied" (p. 41).

The book concludes with two very full indexes of subjects and of authors' names. (*Advertisement.*)

P. P. C.

SECOND INTERNATIONAL CONGRESS OF ENTOMOLOGY.

VOLUME II. TRANSACTIONS, of this Congress, held at Oxford in August, 1912, has appeared. It is edited by K. Jordan and H. Eltringham and is dated Oxford, October 14th, 1913. Printed by Hazell, Watson & Viney, Ld., London and Aylesbury. It is large octavo and consists of 489 pages and Plates III to XXXIV, all in black and white. There are thirty-eight papers by as many authors, titles of which were given in the NEWS for October, 1912. As it corresponds in size and contents to Vol. II, Memoires, of the First Congress, it seems a pity that the same name was not used for the present issue instead of "Transactions."

C. PICADO. LES BROMELIACÉES ÉPIPHYTES CONSIDÉRÉES COMME MILIEU BIOLOGIQUE. Bulletin Scientifique de la France et de la Belgique, 7e Serie T. XLVII, fasc. 3, pp. 215-360, pls. VI-XXIV, 54 text figs. Paris, 21 Oct., 1913.

Previous writings on the biology and the fauna of the epiphytic Bromeliaceae can be divided into three categories, says Senor Picado: A. Those which have for their object the bromelicolous* animals independently of the conditions of the medium; B. Those which bear on the biology of the Bromeliaceae; C. Those on the relations between the Bromeliaceae and their fauna. It is in this third class that his own interesting and excellent memoir belongs.

After a historical sketch (chapter I) of previous researches on the general subject, the biology of the epiphytic Bromeliaceae (chapter II) is considered with special reference to his observations on those of his native country, Costa Rica, whose government granted a subvention for this work. The climatic conditions favorable to the growth of these plants, some features of their structure, macroscopic and microscopic, with a resumé of the work of Schimper and of Tietze (1906) on their physiology, lead up to fuller statements of the author's researches on the phenomena of nutrition in these plants than have heretofore appeared in the *Comptes Rendus* (1912) of the Paris Academy. His results may be briefly summarized that a gum secreted by the plant digests starches and albuminoids and the products of the digestion are absorbed by the leaves, whereby putrefaction in the water held between the leaf bases is avoided. In chapter III a bromeliad is regarded as composed of a central water-containing *aquarium*, divided into as many compartments as there are living leaves, and a peripheral more or less continuous *terrarium*, enclosed by the outer older dead or dying leaves, wherein is found no water but a cellulose mud due to the gradual breaking down of leaf fragments. These two zones of unlike character, the perman-

*In the NEWS and elsewhere we have used the adjective *bromeliadicolous*, while Senor Picado has employed the shorter form as above.

ence† of water in the *aquarium*, its darkness, etc., lead to a number of highly interesting differences in the animals which inhabit even the same plant. The origin and dissemination of the bromelicolous fauna is discussed and comparisons made with the biology and fauna of other "Reservoir Plants." Chapter IV is more technical and is composed of descriptions of larval and adult stages of a few Diptera, Hemiptera, Coleoptera and an earth worm from Costa Rican Bromeliaceae. The brief chapter V is a summary of twenty "Conclusions." There is a bibliography of three pages, while an Appendix (pp. 333-360) lists all the bromelicolous animals from Rotifers to Batrachians known to the author. Previous to his own researches about one hundred such species were known; he has brought the total up to about 250, of which forty-nine were new. The work is highly valuable and well worth reading, even by those who have not the opportunity to work with these plants, on account of its suggestiveness.

(The name *Odontomachus* on page 273 should be replaced by *Apterostigma*; *cf.* p. 348, where also the source of its fungous nourishment is more fully stated).—P. P. C.

Doings of Societies.

FELDMAN COLLECTING SOCIAL.

Meeting of September 17th, 1913, at 1523 South Thirteenth Street, Philadelphia. Ten members were present. J. C. Bradley, of Ithaca, N. Y., visitor. President Haimbach in the chair.

Dr. Castle said he had gotten a few good things in Maryland and near Harrisburg, Pa., but on the whole collecting was very poor.

Mr. Daecke exhibited a rare mosquito, *Culiseta inornatus* Will., from Rockville, Pennsylvania, III-30-13. Also *Brachyopa notata* O. S. (Dip.), Harrisburg, Pa., IV-24-13, which had been recorded from Washington, Oregon, Quebec, Alaska and mountains of New Hampshire, the latter being the most southern locality. He said that *Oncodes dispar* Macq., a little yellow fly, breeds on spiders; Champlin had found a mud wasp nest in a stump at Harrisburg, VIII-20-13, and upon breaking it open found six specimens of this fly inside. The wasp had most

†Senor Picado speaks (pp. 236, 255) of the epiphytic bromeliads constantly retaining water, but in some situations, as on isolated trees or on the trees of the *cerclos*, or hedges, near Cartago, Costa Rica, we have seen them dry.

likely carried the spider to its nest after the fly had laid its eggs upon it and when they hatched the flies had eaten the contents of the nest and Mr. Champlin had broken it open at the psychological moment, as they were all in good condition.

Mr. Harbeck reported catching *Cicindela rugifrons* Dej. on a sandy path near railroad track at Manahawkin, New Jersey, IX-1. Said his nephew had taken him to a park on an island near Trenton and he had caught *C. marginipennis* Dej. along the shore about August 10th. Exhibited a specimen of *Chloromyia* from Woernersville, Pennsylvania, VIII-4-13, with abnormal center legs—these are twice as long as the others. A species of this genus is figured in Williston's Manual.

Mr. George M. Greene recorded seeing a male *Pelecinus polyturator* Dru. (Hym.) and capturing a *Scaphinotus elevatus* Fabr. (Col.) at Great Falls, Virginia, VIII-6-13. Also *Cicindela rufiventris* Dej. as common on Barren Hill at East Falls Church, Virginia, VIII-4-13.

Mr. Kaeber exhibited a small specimen of *Goes tigrina* De G. (Col.) from Philadelphia Neck, VI-21 on oak and *Trichodes nuttalli* Kirby, Red Bank, New Jersey. In discussing the former Mr. Wenzel said he had been collecting it for years in southern Philadelphia and nearby Delaware County, and had always found it on isolated trees which also contained other species of Coleoptera. He showed a very bright yellow form of *Chelymorpha argus* Licht. from Delaware County, VII-12 (both sexes). When first caught he placed them in cyanide and they quickly discolored, becoming almost black. Then he caught more specimens which he killed in wood alcohol and afterward placed in ammonia; these specimens retained their color.

Mr. Wenzel, Jr., said collecting was very good this year up to July.

Mr. Haimbach recorded the capture this year of many Notodontids, including *Apatelodes torrefacta* S. & A., *A. angelica* Grt., a very light form of *torrefacta* (undescribed) and ten species of *Datana*.

Adjourned to the annex.

Meeting of October 15th, 1913, at 1523 South Thirteenth Street, Philadelphia. Fifteen members present, President Haimbach in the chair.

Mr. Wenzel exhibited three boxes of Cerambycidae (*Monilema Goes,* etc.) from which only four known species were missing.

Mr. George M. Greene recorded a species of Diptera which is not in the New Jersey list: *Syrphus fisheri* Walton, from Riverton VII-9-10, collected by C. T. Greene. He also stated that he had acquired the Godfrey collection of North American Coleoptera (approximating ten thousand specimens) by gift.

Mr. Daecke said that on July 19th, 1912, Mr. H. L. Adams had pulled off a piece of hemlock bark ("about the size of your hand") at West Lenox, Pennsylvania, beneath which he found a specimen of *Scaphinotus viduus* Dej., two of *Leptura canadensis* Fabr. and two *Ophthimus opacus* LeC. (Col.).

Mr. Laurent exhibited specimens of *Chrysophanus thoe* Bd.-LeC. (Lep.) male and female, that he captured July 29, 1913, on the meadows in Philadelphia Neck, and stated that to the best of his knowledge, this butterfly had never been captured before in the vicinity of Philadelphia.

Mr. Wenzel said that they have been filling up the low ground, where Mr. Laurent had caught this species, with soil from along the river and other places and that no doubt many seeds had been transplanted in this manner, and he knew of many plants growing there now which were unknown a few years ago. He reported *Lema trilineata* Oliv. (Col.) as common in that locality both this year and last on the "jimson weed."

Mr. Hoyer exhibited a box of Coleoptera collected by boys on a camping trip on Valcour Island, New York, this year. Stated that this island is about a mile from shore in Lake Champlain, opposite the town of Valcour, Clinton County. This contained many interesting and rare species.

Mr. Harbeck recorded a species of *Ophyra* (Dip.) collected

by Mr. Hornig in Philadelphia Neck, IX-24-13, about the piggeries. He believes this to be a species new to this locality.

Adjourned to the annex.

Meeting of November 19th, 1913, at the home of H. A. Wenzel, 4247 Ogden Street, Philadelphia. Eleven members were present, President Haimbach in the chair.

Mr. George M. Greene exhibited an odd pair of pinning forceps invented by Mr. Godfrey, which could not be patented owing to an infringement. These forceps did not seem to be much in favor with the members.

Mr. Laurent exhibited a female *Pamphila campestris* Bdv. (Lep.) that he had captured July 31st on the high meadows in Philadelphia Neck. The speaker stated that, to the best of his knowledge, this was the second record for this butterfly in the vicinity of Philadelphia; the first record was a specimen, or specimens, captured at Cobb's Creek, Pennsylvania, some twenty odd years ago by Eugene M. Aaron. Mr. Haimbach said he had taken this species here.

Mr. Daecke exhibited two specimens of the moth *Haploa lecontei* var. *dyari* Merrick, from Rockville, Pennsylvania, VI-29. Also five specimens of *Tabanus,* which at a casual glance might be taken for one species, but when relaxed the maculations of the eyes are so distinct as to show them to be all different.

Mr. Kaeber said that since recording *Trichodes nuttalli* Kirby (Col.) from Red Bank, New Jersey, at the September meeting he had found another specimen with his unmounted material from the same locality VII-4-08.

Mr. Harbeck said some papers containing tables and descriptions for separating species are very unsatisfactory, but, to prove this is not the case with all, cited the recent paper on *Neurigona* by Van Duzee. After working out the species he had, to his own satisfaction, sent them (upon request) to Mr. Van Duzee, who verified all the identifications as correct.

Adjourned to the annex.

GEORGE M. GREENE, *Secretary.*

THE CONVOCATION WEEK MEETINGS.

Entomological papers were presented to the American Association of Economic Entomologists, the Entomological Society of America, Section K (Physiology and Experimental Medicine) of the American Association for the Advancement of Science, and the American Phytopathological Society, meeting in affiliation at Atlanta, Georgia, December 29, 1913, to January 3, 1914, and to the American Society of Zoologists meeting at Philadelphia December 29 to January 1. The following list gives their titles and authors, although in a number of cases they were read by title only. Those unmarked are from the program of the Economic Entomologists, those starred (*) from the Entomological Society of America, others are followed by an abbreviation of the respective society's name.

At Atlanta the entomological hosts were the State Entomologist, Mr. E. L. Worsham, and members of his staff, Messrs. Chase, Lewis and Spooner, who tendered the visitors a smoker on the evening of January 1 and in many ways added to the enjoyment of the sojourn in the southern city. The meetings were certainly a success in attendance and in the interest evoked by the papers read.

GENERAL SUBJECTS.—J. Chester Bradley, Cornell University.—Collecting insects in the Okefenoke swamp.* Philip P. Calvert, University of Pennsylvania.—The desirability of a bibliographical dictionary of entomologists.* The fauna of epiphytic bromeliads in Costa Rica.* E. P. Felt, State Entomologist of New York.—Gall Insects. The Annual Public Address.* H. T. Fernald, Massachusetts Agricultural College.—Notes on some old European collections.* L. O. Howard, Washington, D. C.—The Education of the Entomologists in the Service of the United States Department of Agriculture. W. C. O'Kane, Durham, N. H.—Further Experience with an Insectary. (Some difficulties experienced, changes made, cost.)

GENERAL MORPHOLOGY AND CYTOLOGY.—A. D. MacGillivray, University of Illinois.—The structure of the thorax in generalized insects.* J. A. Nelson, Bureau of Entomology.—A pair of Tracheal Invaginations on the Second Maxillary Segment of the Embryo of the Honey Bee. (Amer. Soc. Zool.) W. A. Riley, Cornell University.—Some sources of error in the interpretation of insect

tissue.* F. Payne, Indiana University.—Chromosomal Variations in the European Earwig, Forficula auricularia. (Amer. Soc. Zool.)

GENERAL PHYSIOLOGY.—W. M. Barrows, Ohio State University. The reactions of the Orb-weaving Spider, Aranea cavatica, to Rhythmic Vibrations of the Web. (Amer. Soc. Zool.) Norman Eugene McIndoo, Bureau of Entomology, The Olfactory Sense of the Honey Bee. (Amer. Soc. Zool.) E. F. Phillips and George S. Demuth, Bureau of Entomology, The reaction of the Honey Bee to Changes of External Temperature. Instruments (Thermo-Electric Outfit) (Special Scale), used in work on Behavior of the Honey Bee. (Amer. Soc. Zool.) L. M. Peairs, Morgantown, W. Va. The Relation of Temperature to Insect Development. V. E. Shelford, University of Chicago, The Experimental Modifications of Tiger Beetle Color Patterns by Variation of Temperature and Moisture During Ontogeny. (Amer. Soc. Zool.)

GENETICS.—John H. Gerould, Hanover College, A Male Gynandromorph of Colias (Eurymus) eurytheme Showing Dimorphism in the Female Color Pattern. (Amer. Soc. Zool.) Robert K. Nabours, Kansas State Agricultural College, Inheritance in Orthoptera. (Amer. Soc. Zool.) F. H. Mosher, Melrose Highlands, Mass. Relation of the Number of Larval Stages to the Development of Male and Female Gipsy Moths.

INSECTS INJURIOUS TO PLANTS.—P. J. Parrott, Geneva, N. Y., The Growth and Organization of Applied Entomology in the United States. Annual address of the President. F. L. Washburn, St. Anthony Park, Minn. Today's Work in Applied Entomology, (A review of recent work in economic entomology). W. E. Hinds, Auburn, Ala., County Organization in the Boll Weevil Campaign, (Information concerning organization of county agricultural advisory committees, co-ordinating and promoting all movements for rural betterment and bringing merchants and farmers, et al., into helpful cooperation). Leonard Haseman, Columbia, Mo., Entomological Work in Missouri, (A brief discussion of the work which the Department of Entomology is now doing and our plans for extending the work in the future). George A. Dean, Manhattan, Kans., Grasshopper Control Work in Western Kansas, (A brief review of the Grasshopper situation during the last three years. The serious outbreak of the summer of 1913. The organization for a systematic fight. The distribution of 1875 tons of poisoned bran mash. The result of the campaign). Z. P. Metcalf, Raleigh, N. C., Report of Field Work on the South Corn Bill Bug, *Sphenophorus callosus*. A. F. Burgess, Melrose Highlands, Mass., The Present Organization and Methods used by the Bureau of Entomology on the Gipsy Moth Work. Wilmon

Newell, College Station, Texas, A Simple and Economical Method of Filing Entomological Correspondence, (Ordinary pasteboard letter files are used for filing and the correspondence handled by subjects in such a manner as to eliminate the use of filing cabinets, index cards, folders, and transfer cases. The file is self-indexing and has been found practical and efficient in handling correspondence for the past four years). M. A. Yothers, Pullman, Wash., Some New Insects of Economic Importance in the State of Washington, (A brief discussion of the occurrence of new species of "Weevils" found in destructive numbers on fruit trees in the arid regions of the State). A. E. Stene, Kingston, R. I., Some Notes on the Box Leaf Miner, (Notes on the appearance of this insect in Rhode Island. Its present distribution and observations on its life history and methods of control). R. A. Cooley, Bozeman, Mont., Notes on two new Pests of the Currant and Gooseberry, (Notes on the life history, economic importance and means of controlling a weevil, injuring fruit of the currant and a species of thrips injuring the foliage of the currant and gooseberry). A. L. Melander, Pullman, Washington, Can Insects become Immune to Spraying? E. P. Felt, Albany, N. Y., The Reaction of Sugar Maples to Miscible Oils, Notes on Forest Insects. W. H. Goodwin, Wooster, Ohio, Some Factors Affecting Results in the Use of High Temperature for the Control of Insects Injuring Cereal Products. H. T. Fernald, Amherst, Mass., Control of the Onion Thrips and Onion Maggot. C. R. Crosby, Ithaca, N. Y., Experiments Against the Tarnished Plant Bug as an Enemy of Peach Nursery Stock. Glenn W. Herrick, Ithaca, N. Y., Further Data on the Control of the Fruit Tree Leaf Roller, Oviposition of two Apple Pests. W. E. Hinds, Auburn, Ala., Reducing Insect Injuries on Stored Corn, (Outlining factors predisposing to injury, extent of injury, methods of preventing and reducing it). Geo. G. Ainslie, Nashville, Tenn., The Western Corn Root Worm in the South. C. Gordon Hewitt, Ottawa, Canada, Thrips Attacking Oats. L. O. Howard, United States Entomologist, Note on the present status of the Gipsy Moth parasites in New England.* J. A. Hyslop, Washington, D. C., Soil Fumigation for Subterranean Insects. R. A. Studhalter, Insects as Carriers of the Chestnut Blight Fungus, (Amer. Phytop. Soc.) E. R. Sasscer, Washington, D. C., Notes on Entomological Inspection in the District of Columbia. D. M. Rogers, Boston, Mass., The Gipsy Moth and Brown-Tail Moth Quarantine in New England. W. D. Hunter, Washington, D. C., The Control of the Boll Weevil by Quarantine.

INSECTS INJURIOUS TO MAN.—Charles T. Brues, Forest Hills, Boston, Mass., Observations on Insect Borne Diseases in Ecuador and Peru. T. J. Headlee, New Brunswick, N. J., Anti-Mosquito Work in New Jersey. W. E. Britton, New Haven, Conn., A Remark-

able Outbreak of *Culex pipiens* Linn. (Species appearing in West River, New Haven, Conn., where fish had been killed.) C. Gordon Hewitt, Ottawa, Canada, Further Observations on the Breeding Habits of the House Fly and its control. A. W. Morrill, Phoenix, Ariz. Experiments with House Fly Baits and Poisons. (Tests of the various fly trap baits and poisons used for house flies to determine their relative attractiveness and effectiveness.) A. H. Jennings, Bureau of Entomology, Washington, D. C., The Entomological Aspects of the Pellagra Investigation of the Thompson, McFadden Commission. (Section K, A. A. A. S.) H. F. Perkins, University of Vermont, The Fly, Oestrus Ovis, Parasitic in Man. (Amer. Soc. Zool.)

BENEFICIAL INSECTS.—Leonard Haseman, Columbia, Mo., Beekeeping and Apiary Inspection in Missouri, (A brief report of the work of the State Apiary Inspector and the work which the Department of Entomology has undertaken.) The reading of papers was followed by a discussion of Apiary Inspection in the United States. Subject: The Relation of the Inspection of Apiaries to other Factors for the Education of the Beekeeper. J. W. McColloch, Manhattan, Kans., Notes on the Life History, Distribution and Efficiency of the Egg Parasite of the Chinch Bug. (This paper dealt with the length of the life cycle, number of broods, habits, distribution in Kansas, and percentage of parasitism at various times during the summer.) H. E. Hodgkiss and P. J. Parrott, Geneva, N. Y., The Parasites of the San Jose Scale in New York, Species and Distribution. Otto H. Swezey, Honolulu, Hawaii, Notes on Parasites in the Hawaiian Islands. William Moore, University of Minnesota. —A comparison of the enemies of Toxoptera graminium in South Africa and the United States.*

ORTHOPTERA.—P. J. Parrott, New York Agricultural Experiment Station. Studies on the Snowy Tree-cricket, *Oecanthus niveus*, with references to apple bark diseases.* E. L. Worsham, State Entomologist of Georgia. Some notes regarding the natural history of the mole cricket.*

PLATYPTERA, NEUROPTERA, ODONATA.—J. S. Houser, Ohio Agricultural Experiment Station, *Comventzia hageni* Banks, life-history notes and variations in wing venation.* J. T. Lloyd, Cornell University, The structure of the hind intestine of *Corydalis*.* See also Coleoptera.

HEMIPTERA, THYSANOPTERA.—Herbert Osborn, Ohio State University, Studies on the geographical distribution of leaf-hoppers, especially of Maine.* The box elder bug in Ohio. R. W. Leiby, Cornell University, Notes on the external anatomy of some Pentatomidae.* R. D. Whitmarsh, Wooster, Ohio, The Life History of the Green Soldier Bug, *Nezara hilaris*. Alvah Peterson, University of Illinois, Notes on the head structures of Thysanoptera.*

COLEOPTERA.—A. F. Conradi, Clemson College, A little known wire-worm, *Horistonotus uhleri.** Robert Matheson, Cornell University, Life-history notes on *Psephenus lecontei* and *Hydroporus septentrionalis.** C. L. Metcalf, Raleigh, N. C., The Egg Laying Habits of the Pecan Twig Girdler, *Oncideres cingulatus* Say. V. E. Shelford, University of Chicago.—The elytral tracheation of the subfamilies and genera of Cicindelidae.* The sequence of color changes during ontogeny in *Cicindela.** E. L. Worsham and J. Chester Bradley, Office State Entomologist of Georgia, Exhibit of Collections of Coleoptera and Odonata from Georgia belonging to Georgia State Board of Entomology.*

LEPIDOPTERA.—L. S. Barber, Cornell University, The biology of *Gelechia gallaesolidaginis* with some reference to some of its parasites.* Stanley B. Fracker, University of Illinois, New characters in the classification of microlepidopterous larvae.* Arthur Gibson, Ottawa, Canada, A New Destructive Cutworm of the Genus Porosagrotis Occurring in Western Canada. (Preliminary note on the occurrence and destructive nature of a new enemy of Cereals.) H. A. Gossard, Wooster, O., The Lesser Peach Borer, *Sesia pictipes.* (Life history studies in the Lake Erie fruit belt.) Cornelia F. Kephart, Cornell University, The poison glands of *Euproctis chrysorroea* Linn.* Edna Mosher, University of Illinois, Some interesting structures in the pupae of the Lepidoptera.* F. B. Paddock, College Station, Texas, Life History of the Bee Moth or Wax Worm, (A brief review of the life history of this insect as established by experimental work at College Station, Texas. There are in this latitude three generations. Carbon bisulfide has been found to be effective in the control of this pest.) N. L. Patridge, University of Illinois, The tracheation of the anal area of the wings of the Lepidoptera and the homology of the veins.*

DIPTERA.—Leonard Haseman, University of Missouri, The life-history of a species of Psychodidae.* C. Gordon Hewitt, Ottawa, Canada, The Occurrence of the Warble Fly, *Hypoderma bovis,* in Canada. Paul S. Welch, Kansas Agricultural College, Observations on the habits and life history of *Hydromyza confluens* Loew.* James Zetek, Panama Canal Commission, The dispersal of *Musca domestica.**

OBITUARY.

Dr. George William Peckham, known for his work on spiders and on wasps, died January 11, 1914, at Milwaukee, Wisconsin. We hope to present a notice of his life in a later issue.

EXCHANGES.

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☞ These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued

Dynastes hercules and *Attacus atlas*—the largest beetle and moth in the world for exchange.—A. F. Porter, Decorah, Iowa.

Cicindela modesta in exchange for N. A. Coleoptera. Send list of not more than twenty species that you have to offer.—Philip Laurent, 31 East Mt. Airy Ave., Phila., Pa.

Wanted—Psyche, Nos. 265, 267, 268, Vol 8, and 297, 298, 300, Vol. 9, or will buy Vols. 8 and 9 complete; also want complete set of American Entomologist.—Librarian, Stanford University, California.

Will name and return Beetles of certain families. Correspondence with beginners and inexperienced collectors desired.—C. A. Frost, 26 Pond St., So. Framingham, Mass.

Wanted—Pupae of *Papilio ajax* and *rutulus*.—Ward's Natural Science Establishment, 84 College Ave., Rochester, N. Y.

Mordellidae (Coleoptera) wanted from all parts of the world for cash or exchange. Also desire to exchange North American Coleoptera.—Alan S. Nicolay, 416a Girard Ave., Brooklyn, N. Y.

Wanted—North American specimens of the following European Heteroptera: *Dasycoris pilicornis* Burm.; *Gastrodes ferrugineus* Linne; *Gonianotus marginepunctatus* Wolff; *Microtoma atrata* Goeze; also the following: *Orsillus scolopax* Say: *Acantholoma denticulata* Stal; *Agrammodes costatus* Uhl. and *Galeatus peckhami* Ashm.—J. R. de la Torre Bueno, 14 Dusenbury Place, White Plains, New York.

Hydroporus and Deronectes—Species of these and allied genera wanted from all parts of the world, either by purchase or exchange. Specimens must be perfect, but not necessarily named.—John D. Sherman, Jr., 403 Seneca Ave., Mount Vernon, N. Y.

Lepidoptera—Prime specimens of butterflies from this section (either spread or papered) in exchange for other North American species new to my collection.—R. A. Leussler, 1137 So. 31st St., Omaha, Neb.

Wanted for Cash—Fertile eggs of *Attacus atlas*, *Attacus edwardsii* in season or for exchange for *Actias mimosae*, *Antheraea pernyi* and other exotic and native eggs.—A. J. Potter, East Killingly, Conn.

I have for exchange live pupae of *Ph. achemon*, *H. aurora*, *P. sexta*, *P. asterias*, *P. quinquemaculata*, *T. polyphemus*, *E. tityrus*, *chersis* and *A. octomaculata*, also lot of dupls. in papers from Europe. Wish pupae from Arizona, California or Mexico.—J. N. Lang, 1433 So. 59th Avenue, Cicero, Ill.

Urania riffius—Most beautiful exotic to exchange for other exotics or rare Catocolas of North America.—Jos. H. Reading, 1436 N. Rockwell St., Chicago, Ill.

Coccidae—California Coccidae exchanged for specimens from all parts of the world.—E. O. Essig, Secretary State Commission of Horticulture, Sacramento, Cal.

Photographs of Entomologists Desired.

The Entomological Section of the Philadelphia Academy of Natural Sciences desires for its entomological album the photograph of every entomological student. The collection contains over 300 at this date. A list was published in the NEWS 1902, pages 45-47, of those in the album at that time. We hope that those who can do so will write their names and date of birth and the date when the photograph was taken on the back of each photo, along with any other information concerning themselves they may wish to impart.

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